PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2000-293452
(43)Date of publication of application : 20.10.2000

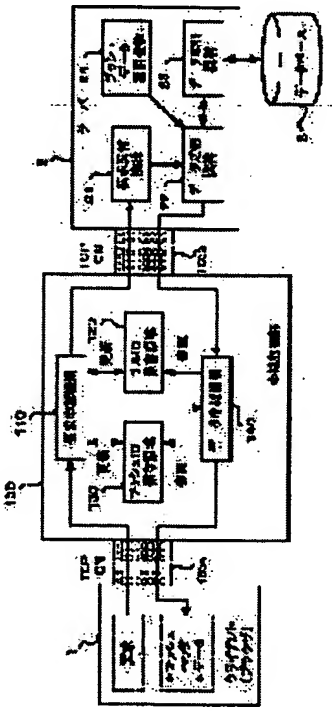
(51)Int.CI. G06F 13/00
G06F 15/177

(21)Application number : 11-094471
(22)Date of filing : 01.04.1999

(71)Applicant : NTT DATA CORP
(72)Inventor : ISHIKAWA YUJI
SUDO MASANORI
YOKOYAMA KAZUTOSHI

(54) DATA REPEATING DEVICE, DATA COMMUNICATION SYSTEM, DATA COMMUNICATION METHOD AND RECORDING MEDIUM

(57)Abstract:
PROBLEM TO BE SOLVED: To obtain a data repeating device, a data communication system and a data communication method capable of continuously providing data based on the request of a client and providing data based on active decision of a server and to obtain a recording medium.
SOLUTION: When a data transmitting request of a pull type is given from a browser 1 while a server 2 provides data by a push type, connections 150 and 150B for transmitting data by the pull type are newly established. A data repeating mechanism 140 transmits a push header from a request repeating mechanism 110 to the browser 1 by using the newly established connection 150A. The browser 1 receiving transmitted data by the pull type keeps the newly established connection without disconnecting. The server 2 can restart providing of data by the push type by using the connections 150A and 150B.



LEGAL STATUS

[Date of request for examination]

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

(19)日本国特許庁（ＪＰ）　(12)公開特許公報（Ａ）　(11)特許出願公開番号
特開2000－293452
（P2000－293452A）
(43)公開日　平成12年10月20日(2000.10.20)

(51)Int.Cl.⁷		識別記号	FI		テーマコード(参考)
G06F	13/00	353	G06F	13/00	353A　5B045
	15/177	676		15/177	676Z　5B089

審査請求　未請求　請求項の数8　ＯＬ　（全 16 頁）

(21)出願番号　特願平11－94471

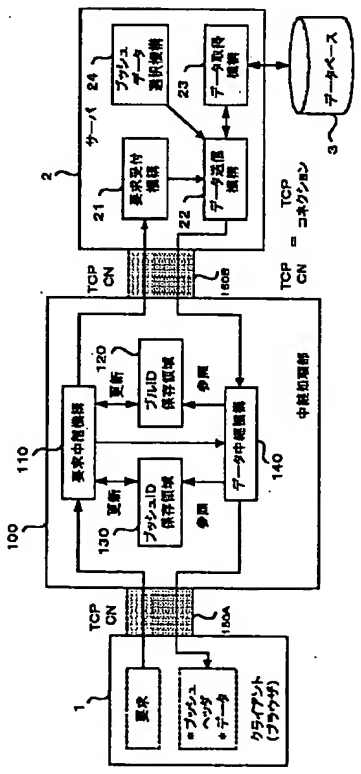
(22)出願日　平成11年４月１日(1999.4.1)

(71)出願人　000102728
株式会社エヌ・ティ・ティ・データ
東京都江東区豊洲三丁目３番３号
(72)発明者　石川　裕治
東京都江東区豊洲三丁目３番３号　株式会社エヌ・ティ・ティ・データ内
(72)発明者　須藤　昌徳
東京都江東区豊洲三丁目３番３号　株式会社エヌ・ティ・ティ・データ内
(74)代理人　100095407
弁理士　木村　満

最終頁に続く

(54)【発明の名称】　データ中継装置、データ通信システム、データ通信方法及び記録媒体

(57)【要約】
【課題】　クライアントの要求に基づくデータ提供と、サーバの能動的な決定に基づくデータ提供とを、継続的に実行することのできるデータ中継装置、データ通信システム、データ通信方法及び記録媒体を提供する。
【解決手段】　サーバ2がプッシュ型によるデータ提供中に、ブラウザ1からプル型のデータ送信要求があると、プル型でデータを送信するためのコネクション１５０Ａ、１５０Ｂが新たに確立される。データ中継機構１４０は、上記新たに確立されたコネクション１５０Ａを使って、要求中継機構１１０からのプッシュヘッダをブラウザ1に送信する。サーバ2からのプル型による送信データを受信したブラウザ1は、上記新たに確立されたコネクションを切断せずに維持する。サーバ2は、そのコネクション１５０Ａ、１５０Ｂを使って、プッシュ型によるデータ提供を再開できる。



1

【特許請求の範囲】

【請求項1】クライアントと、該クライアントにネットワークを介して接続され、クライアントからの要求に応じてデータを送信するプル型のデータ送信機能と自己の能動的決定によりクライアントにデータを送信するプッシュ型のデータ送信機能とを備えるサーバと、前記サーバとクライアントとを接続するネットワークと、より構成されるデータ送受信システムにおいて、ネットワークを介して前記サーバとクライアントに接続され、前記サーバとクライアントとの間でデータを送受信するためのデータ中継装置であって、

前記サーバがプッシュ型データ送信によりデータをクライアントに送信している間に、前記クライアントがプル型によるデータ送信すべき旨の送信要求を出力すると、該送信要求を受信する受信手段と、

前記送信要求に応答して、プル型によるデータ送信のために確立されるコネクションを維持すべき旨の維持情報を前記クライアントへ送信する送信手段と、

前記プル型によるデータ送信が終了した後においても、前記維持情報を受信した前記クライアントにより維持されている前記コネクションを介して、前記サーバからのプッシュ型による送信データを送受信する中継手段と、

を備えることを特徴とするデータ中継装置。

【請求項2】前記中継手段は、プル型によるデータ送信のために確立されたコネクションを識別するための識別情報を記憶する記憶手段を備え、前記識別情報で示されるコネクションを介して、プッシュ型によるデータ送信のデータを送受信する、ことを特徴とする請求項1に記載のデータ中継装置。

【請求項3】前記記憶手段は、複数のクライアントと前記サーバとの間で確立される複数のコネクションそれぞれを識別するための識別情報を、当該複数のクライアント毎に記憶する複数の記憶領域を備える、ことを特徴とする請求項2に記載のデータ中継装置。

【請求項4】クライアントにネットワークを介して接続され、クライアントからの要求に応じてデータを送信するプル型のデータ送信機能と自己の能動的決定によりクライアントにデータを送信するプッシュ型のデータ送信機能とを備えるサーバと、

前記サーバがプッシュ型データ送信によりデータをクライアントに送信している間に、前記クライアントがプル型によるデータ送信すべき旨の送信要求を出力すると、該送信要求を受信する受信手段と、

前記送信要求に応答して、プル型によるデータ送信のために確立されるコネクションを維持すべき旨の維持情報を前記クライアントへ送信する送信手段と、

前記プル型によるデータ送信が終了した後においても、前記維持情報を受信した前記クライアントにより維持されている前記コネクションを介して、前記サーバからのプッシュ型による送信データを送受信する中継手段と、

2

を備える、ことを特徴とするデータ通信システム。

【請求項5】前記中継手段は、プル型によるデータ送信のために確立されたコネクションを識別するための識別情報を記憶する記憶手段を備え、前記識別情報で示されるコネクションを介して、プッシュ型によるデータ送信のデータを送受信する、ことを特徴とする請求項4に記載のデータ通信システム。

【請求項6】前記記憶手段は、複数のクライアントと前記サーバとの間で確立される複数のコネクションそれぞれを識別するための識別情報を、当該複数のクライアント毎に記憶する複数の記憶領域を備える、ことを特徴とする請求項5に記載のデータ通信システム。

【請求項7】プッシュ型又はプル型によるデータ送信を実施するサーバとクライアントとの間でデータを送受信するデータ中継装置におけるデータ通信方法であって、

前記サーバがプッシュ型によるデータ送信の実施中に、前記クライアントからのプル型によるデータ送信すべき旨の送信要求を受信する受信ステップと、

前記受信ステップで受信された送信要求に応答して、プル型によるデータ送信のために確立されるコネクションを維持すべき旨の維持情報を前記クライアントへ送信する送信ステップと、

前記プル型によるデータ送信が終了した後においても、前記維持情報を受信したクライアントにより維持されている前記コネクションを介して、前記サーバからのプッシュ型による送信データを送受信する中継ステップと、

を含むことを特徴とするデータ通信方法。

【請求項8】サーバがプッシュ型によるデータ送信の実施中に、クライアントからのプル型によるデータ送信すべき旨の送信要求を受信する受信機能と、

前記受信機能で受信された送信要求に応答して、プル型によるデータ送信のために確立されるコネクションを維持すべき旨の維持情報を前記クライアントへ送信する送信機能と、

前記プル型によるデータ送信が終了した後においても、前記維持情報を受信したクライアントにより維持されている前記コネクションを介して、前記サーバからのプッシュ型による送信データを送受信する中継機能と、

を実行させるプログラムが記録されていることを特徴とするコンピュータ読み取り可能な記録媒体。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明は、プッシュ型又はプル型によるデータ送信を実施するサーバとクライアントとの間でデータを送受信するデータ中継装置、データ通信システム、データ通信方法及び記録媒体に関する。

【0002】

【従来の技術】クライアント・サーバシステムなどにおいて使用されているHTML（HyperText Markup Language：ハイパーテキスト記述言語）文書を表示する閲覧

ソフトとしてWWW(World Wide Web) ブラウザ(以下、ブラウザという) が知られている。

【０００３】このブラウザにおいて1 つのHTML 文書が表示される領域を、フレームという。このブラウザはクライアントとして機能する。

【０００４】1 つのブラウザは複数のフレームを持つことができる。各フレームはサーバに要求を出すことにより、TCP (Transmission Control Protocol) によるコネクションを張ってデータを授受する。尚、1 つのフレームが同時に張ることのできるコネクションは1 つのみである。

【０００５】ブラウザへサーバからデータを提供する方式には、プル型データ提供方式とプッシュ型データ提供方式の2 つがある。

【０００６】プル型データ提供方式はブラウザの要求に基づいてデータを提供するものである。この方式では、利用者が所望する情報を指定する。一般に、WWWのサーバはこの方式でデータを提供している。

【０００７】これに対して、プッシュ型データ提供方式はサーバの能動的な決定に基づいてデータをブラウザに提供するものである。この方式では、サーバが送信する情報を選択し、利用者はそれを受動的に受信する。プッシュ型データ提供方式を実現するための技術としては、Netscape 社からサーバプッシュと呼ばれる技術が提案されている(「 続・HTML 入門」(ローラ・リメイ著、武舎広幸、久野禎子、久野靖　訳、プレンティスホール出版、１９９５年) 、Netscape 社のダイナミックドキュメント に関するページ(http://home.netscape.com/assist/net-sites/pushpull.html) が広く知られている。

【０００８】プッシュ型データ提供方式によりデータ提供するためには、所定期間、コネクションが維持されている必要がある。コネクションを維持する手段として、サーバプッシュと呼ばれる方法があり、一部のブラウザには実装されている。この様なブラウザの例としては、Netscape 社の「Netscape　Navigator　version1・1 以降の製品」があり、広く普及している。ブラウザのサーバプッシュの機能を利用するためには、サーバからブラウザに次に示すようなデータを伝送する。

【０００９】Content-type: multipart/x-mixed-replace;boundary=BOUND--BOUND

このようなデータを、以下の説明においてはプッシュヘッダと言うことにする。

【００１０】ここで、上記2 つの方式の何れでもデータ提供が可能なデータ提供システムの構成例を図8 に示す。

【００１１】このデータ提供システムは、ブラウザ1 と、サーバ2 と、データベース3 とを備えている。サーバ2 は、要求受付機構2１と、データ送信機構2２と、

データ取得機構2３と、プッシュデータ選択機構2４とを備えている。ブラウザ1 とサーバ2 との間に、TCP によるコネクション4 が確立される。

【００１２】このデータ提供システムにおける、プル型データ提供方式によるデータ提供処理動作について、図９及び図１０を参照して説明する。

【００１３】図１０に示すように、ブラウザ1 から送信された要求をサーバ2 の要求受付機構2１が受信すると(Ｓ４１) 、ブラウザ1 とサーバ2 間にコネクション4 が確立する。

【００１４】そして、サーバ2 において、要求受付機構２１は、受信したブラウザ1 からの要求をデータ送信機構2２に伝達する。データ送信機構2２は、要求に応じたデータの検索をデータ取得機構2３に依頼する。データ取得機構2３は、依頼内容に応じたデータをデータベース3 から読み出して、データ送信機構2２に渡す。データ送信機構2２は、データ取得機構2３による検索結果を、コネクション4 を介してブラウザ1 へ送信する(Ｓ４２) 。

【００１５】ブラウザ1 は、サーバ2 からのデータを受信した場合には、確立されているコネクション4 を切断する。そして、ブラウザ1 から次の要求が送信された場合においても、上述した処理と同様の処理が行われる(Ｓ４３、Ｓ４４) 。

【００１６】次に、データ提供システムにおいて、プッシュ型データ提供方式によるデータ提供処理動作について、図１１及び図１２を参照して説明する。

【００１７】図１２に示すように、ブラウザ1 から送信されたプッシュ型データ提供サービス開始要求をサーバ2 の要求受付機構2１が受信すると(Ｓ６１) 、ブラウザ1 とサーバ2 との間にコネクションが確立する。

【００１８】サーバ2 において、要求受付機構2１は、プッシュ型データ提供サービス開始要求を受信した場合、プッシュヘッダの送信要求をデータ送信機構2２に伝達する。データ送信機構2２は、プッシュヘッダの検索をデータ取得機構2３に依頼する。データ取得機構2３は、プッシュヘッダをデータベース3 から読み出して、データ送信機構2２に渡す。データ送信機構2２は、受け取ったプッシュヘッダを、コネクション4 を介してブラウザ1 へ送信する(Ｓ６２) 。

【００１９】これ以降においては、サーバ2 は、ブラウザ1 からのプッシュ型サービス終了要求を受信するまで、自己が能動的に決定したデータをデータベース3 から読み出すと共に、このデータを、コネクション4 を介して、ブラウザ1 へ送信する(Ｓ６３、Ｓ６４) 。

【００２０】すなわち、プッシュデータ選択機構2４は、適切なタイミングで、どのデータをブラウザ1 に送信するかを選択し、この選択結果をデータ送信機構2２に伝達する。データ送信機構2２は、選択結果(所望のデータ) の検索をデータ取得機構2３に依頼する。デー

5

タ取得機構23は、データベース3を検索して、その検索結果をデータ送信機構22に渡す。データ送信機構22は、受け取った検索結果を、コネクション4を介して、ブラウザ1へ送信する。

【0021】そして、サーバ2は、ブラウザ1からのプッシュ型データ提供サービス終了要求を受信すると（S65）、確立しているコネクションを切断する。

【0022】

【発明が解決しようとする課題】しかしながら、上記従来のデータ提供システムにおいては、プル型データ提供方式又はプッシュ型データ提供方式のいずれかの方式によるデータ提供を実施することはできるが、2つの方式を組み合わせて、データ提供する場合には、以下のような問題が発生する。

【0023】図13に示すように、ブラウザ1とサーバ2間にコネクション（ここでは、これをコネクションaとする）が確立して、サーバ2がプッシュ型でデータ提供している最中に（S71、S72、S73）、ブラウザ1からサーバ2へ、プル型のデータ提供の要求が送信された場合には（S74）、ブラウザ1とサーバ2間に新たなコネクション（ここでは、これをコネクションbとする）が確立して、その要求に応じたデータ（プル型のデータ提供によるデータ）が、サーバ2からブラウザ1へ送信される（S75）。

【0024】1つのフレームには1つのコネクションのみしか張ることができないので、上記コネクションaは、ブラウザ1によって、プル型のデータ提供要求のときに切断される。また、ブラウザ1は、プル型のデータ提供方式により提供されたデータを受信すると、上記コネクションbを切断する。この結果、コネクションa及びコネクションb共に切断されたことになる。

【0025】ところが、サーバ2においては、ブラウザ1からプッシュ型サービス終了要求が送信されて来ないので、プル型のデータ提供処理を終了した後、中断していたプッシュ型によるデータ提供を再開すべく、自己が決定したデータを、ブラウザ1へ送信する（S76）。

【0026】しかし、コネクションが確立されていないので、プッシュ型によるデータ送信は失敗となる。すなわち、サーバ2はフレームに対するコネクションを全て失ってしまうので、プッシュ型のデータ提供を継続することができない。

【0027】このように、従来のデータ提供システムにおいては、プッシュ型でデータ提供している最中に、プル型のデータ提供の要求が発生し、この要求に応答してデータ提供した後、中断していたプッシュ型のデータ提供を継続することが出来ないという問題があった。

【0028】そこで、この発明の目的は、クライアントの要求に基づくデータ提供と、サーバの能動的な決定に基づくデータ提供とを、継続的に実行することのできるデータ中継装置、データ通信システム、データ通信方法

6

及び記録媒体を提供することにある。

【0029】

【課題を解決するための手段】上記目的を達成するため、本発明の第1の観点に係るデータ中継装置は、クライアントと、該クライアントにネットワークを介して接続され、クライアントからの要求に応じてデータを送信するプル型のデータ送信機能と自己の能動的決定によりクライアントにデータを送信するプッシュ型のデータ送信機能とを備えるサーバと、前記サーバとクライアントとを接続するネットワークと、より構成されるデータ送受信システムにおいて、ネットワークを介して前記サーバとクライアントに接続され、前記サーバとクライアントとの間でデータを送受信するためのデータ中継装置であって、前記サーバがプッシュ型データ送信によりデータをクライアントに送信している間に、前記クライアントがプル型によるデータ送信すべき旨の送信要求を出力すると、該送信要求を受信する受信手段と、前記送信要求に応答して、プル型によるデータ送信のために確立されるコネクションを維持すべき旨の維持情報を前記クライアントへ送信する送信手段と、前記プル型によるデータ送信が終了した後においても、前記維持情報を受信した前記クライアントにより維持されている前記コネクションを介して、前記サーバからのプッシュ型による送信データを送受信する中継手段と、を備える、ことを特徴とする。

【0030】このようなデータ中継装置においては、プッシュ型のデータ送信の最中に、プル型によるデータ送信が行われ、プッシュ型のデータ送信時のコネクションが切断された場合であっても、維持されているプル型によるデータ送信時のコネクションを使って、再度、プッシュ型のデータ送信を継続することができる。

【0031】前記中継手段は、例えば、プル型によるデータ送信のために確立されたコネクションを識別するための識別情報を記憶する記憶手段を備え、前記識別情報で示されるコネクションを介して、プッシュ型によるデータ送信のデータを送受信するようにしても良い。

【0032】この場合、中継手段は、サーバからプッシュ型によるデータ送信のデータを受信すると、記憶手段の記憶内容を参照して読み出した識別情報で示されるコネクション（プル型によるデータ送信時に確立されたコネクション）を介して、受信したデータを、クライアントへ送信する。従って、プル型によるデータ送信の実施のために中断されていた、プッシュ型によるデータ送信を再開させることができる。

【0033】また、前記記憶手段は、複数のクライアントと前記サーバとの間で確立される複数のコネクションそれぞれを識別するための識別情報を、当該複数のクライアント毎に記憶する複数の記憶領域を備えるようにしても良い。この場合も、上記同様に、複数のクライアント毎に、プル型によるデータ送信の実施のために中断さ

れていたプッシュ型によるデータ送信を、再開させることができる。

【００３４】上記目的を達成するため、本発明の第2の観点に係るデータ通信システムは、クライアントにネットワークを介して接続され、クライアントからの要求に応じてデータを送信するプル型のデータ送信機能と自己の能動的決定によりクライアントにデータを送信するプッシュ型のデータ送信機能とを備えるサーバと、前記サーバがプッシュ型データ送信によりデータをクライアントに送信している間に、前記クライアントがプル型によるデータ送信すべき旨の送信要求を出力すると、該送信要求を受信する受信手段と、前記送信要求に応答して、プル型によるデータ送信のために確立されるコネクションを維持すべき旨の維持情報を前記クライアントへ送信する送信手段と、前記プル型によるデータ送信が終了した後においても、前記維持情報を受信した前記クライアントにより維持されている前記コネクションを介して、前記サーバからのプッシュ型による送信データを送受信する中継手段と、を備えることを特徴とする。

【００３５】前記中継手段は、例えば、プル型によるデータ送信のために確立されたコネクションを識別するための識別情報を記憶する記憶手段を備え、前記識別情報で示されるコネクションを介して、プッシュ型によるデータ送信のデータを送受信する。

【００３６】また、前記記憶手段は、複数のクライアントと前記サーバとの間で確立される複数のコネクションそれぞれを識別するための識別情報を、当該複数のクライアント毎に記憶する複数の記憶領域を備えてもよい。

【００３７】上記目的を達成するため、本発明の第3の観点に係るデータ通信方法は、プッシュ型又はプル型によるデータ送信を実施するサーバとクライアントとの間でデータを送受信するデータ中継装置におけるデータ通信方法であって、前記サーバがプッシュ型によるデータ送信の実施中に、前記クライアントからのプル型によるデータ送信すべき旨の送信要求を受信する受信ステップと、前記受信ステップで受信された送信要求に応答して、プル型によるデータ送信のために確立されるコネクションを維持すべき旨の維持情報を前記クライアントへ送信する送信ステップと、前記プル型によるデータ送信が終了した後においても、前記維持情報を受信したクライアントにより維持されている前記コネクションを介して、前記サーバからのプッシュ型による送信データを送受信する中継ステップと、を含むことを特徴とする。

【００３８】上記目的を達成するため、本発明の第4の観点に係るコンピュータ読み取り可能な記録媒体は、サーバがプッシュ型によるデータ送信の実施中に、クライアントからのプル型によるデータ送信すべき旨の送信要求を受信する受信機能と、前記受信機能で受信された送信要求に応答して、プル型によるデータ送信のために確立されるコネクションを維持すべき旨の維持情報を前記クライアントへ送信する送信機能と、前記プル型によるデータ送信が終了した後においても、前記維持情報を受信したクライアントにより維持されている前記コネクションを介して、前記サーバからのプッシュ型による送信データを送受信する中継機能と、を実行させるプログラムを記録することを特徴とする。

【００３９】

【発明の実施の形態】以下、本発明の実施の形態を、図面を参照して説明する。

【００４０】図1は、本発明の実施の形態に係るデータ中継装置を有するデータ通信システムの構成を示す構成図である。

【００４１】このデータ通信システムは、クライアント（ブラウザ）１と、データベース3を格納したハードディスク等の2次記憶装置が接続されたサーバ2と、ハードディスク等の2次記憶装置５０が接続されたデータ中継装置６０と、がネットワーク７０に接続された構成になっている。なお、図1において、図8に示した構成要素と同様の機能を果たす構成要素には、同一の符号を付している。

【００４２】２次記憶装置５０には、プッシュ型及びプル型のデータ提供方式を組み合わせた複合型のデータ提供方式によるデータ通信処理（データ通信機能）を実行させるためのプログラム（これを、中継プログラムとする）が格納されている。

【００４３】データ中継装置６０は、クライアント１及びサーバ2との間でデータの送受信を行うものであり、送受信部６１と、メモリ６２と、中央処理装置（以下、ＣＰＵという）６３と、を備えている。

【００４４】送受信部６１は、ネットワーク７０を介して、クライアント１及びサーバ2との間でデータを送受信する。

【００４５】メモリ６２には、２次記憶装置５０からロードされる上記中継プログラムを記憶する記憶領域、ワークエリアが設けられている。

【００４６】ＣＰＵ６３は、装置全体を制御するとともに、２次記憶装置５０からメモリ６２に上記中継プログラムをロードして実行することにより、上記複合型データ提供方式によるデータ通信処理を実行する。この複合型データ提供方式によるデータ通信処理の詳細については、後述する。

【００４７】図2は、本発明の実施の形態に係るデータ中継装置を有するデータ通信システムを機能的に示した機能ブロック図である。図2に示すように、このデータ通信システムは、図8に示した従来のシステムの構成において、中継処理部１００を、ブラウザ1とサーバ2間に追加した構成になっている。なお、図2において、図8に示した構成要素と同様の機能を果たす構成要素には、同一の符号を付している。

【００４８】中継処理部１００は、データ中継装置６０

が、２次記憶装置５０から読み込んだ上記中継プログラムを実行することにより実現されるものであり、要求中継機構１１０と、プルＩＤ保存領域１２０と、プッシュＩＤ保存領域１３０と、データ中継機構１４０とから構成される。

【００４９】要求中継機構１１０は、ブラウザ1から要求（データ送信要求）を受け取ると、所定の処理を実行した後、その要求をサーバ2に渡す。なお、要求中継機構１１０には、固定長データであるプッシュヘッダが予め保持されている。

【００５０】また、要求中継機構１１０は、プッシュ型データ提供サービス開始要求を受け取った場合は、プッシュ型データ提供サービス終了要求を受け取るまでは、その開始要求を一時的に保持しておく。

【００５１】これは、サーバ2がプッシュ型によるデータ提供を実施中に、ブラウザ1からのプル型のデータ送信要求があった場合に、プッシュ型のデータ提供が中断された後、プル型のデータ提供が実施される。これは、その後、要求中継機構１１０が、サーバ2に、プッシュ型のデータ提供を再開させるときに、プッシュ型データ提供サービス開始要求を、サーバ2へ送信するのに必要だからである。

【００５２】ここで、ブラウザ1からの要求を要求中継機構１１０が受け取ることにより、ブラウザ1と中継処理部１００との間に上述したＴＣＰによるコネクション１５０Ａが確立し、要求中継機構１１０からの要求をサーバ2が受け取ることにより、中継処理部１００とサーバ2との間に上述したＴＣＰによるコネクション１５０Ｂが確立する。そして、サーバ2から提供されるデータは、コネクション１５０Ｂ、中継処理部１００、及びコネクション１５０Ａを経て、ブラウザ1に入力される。

【００５３】また、ブラウザ1がコネクション１５０Ａを切断した場合は、中継処理部１００はコネクション１５０Ｂを切断する。さらに、中継処理部１００がコネクション１５０Ａ、１５０Ｂを共に切断することもある。これについては後述する。

【００５４】従って、これ以降の説明においては、「コネクションが確立」という場合には、コネクション１５０Ａ、１５０Ｂが共に確立していることを意味し、「コネクションが切断」という場合は、コネクション１５０Ａ、１５０Ｂが共に切断されていることを意味する。

【００５５】プルＩＤ保存領域１２０は、プル型によるデータ提供の要求の送信によって確立したコネクションの識別情報（以下、ＩＤという）を保存するための記憶領域である。この領域に保存されたＩＤで示されるコネクションは、常に接続されているとは限らず、既に切断されている場合も有り得る。

【００５６】上記コネクションのＩＤの例としては、ＡＰＩ（Application Program Interface）としてソケットを使用している場合には、ソケット番号を使用する。

【００５７】プッシュＩＤ保存領域１３０は、現在、ブラウザ1との間で維持されているコネクション（すなわち、コネクション１５０Ａ）のＩＤを保持するための記憶領域である。コネクションが無い場合には、プッシュＩＤ領域１３０は「空」にされる。一方、プッシュＩＤ保存領域１３０にＩＤが保存されている場合は、コネクションが確立されていることを、システムが保証する。

【００５８】データ中継機構１４０は、サーバ2からのデータ、又は要求中継機構１１０からのプッシュヘッダを受け取ると、現在、ブラウザ1との間で維持されているコネクションを使って、ブラウザ1にデータ又はプッシュヘッダを送信する。

【００５９】次に、係る構成のデータ通信システムの複合型データ提供方式によるデータ通信処理について、図３に示すフローチャートを参照して説明する。

【００６０】中継処理部１００が、ブラウザ1から送信された要求を受信すると（ステップＳ２０１）、ブラウザ1とサーバ2との間にコネクション（すなわち、コネクション１５０Ａ、１５０Ｂ）が確立する（ステップＳ２０２）。

【００６１】中継処理部１００は、受信した要求が、プッシュ型データ提供サービス終了要求であるか否かを判断し（ステップＳ２０３）、その要求でない場合は、受信した要求をサーバ2へ送信すると共に（ステップＳ２０４）、プッシュ型のデータ提供のために確立しているコネクションが切断されたか否かを判断する（ステップＳ２０５）。

【００６２】ステップＳ２０５において、コネクションが切断されていない場合、サーバ2においては、要求受付機構２１は、受け取った要求をデータ送信機構２２に伝達する（ステップＳ２０６）。データ送信機構２２は、要求に応じた所望のデータの検索をデータ取得機構２３に依頼する。データ取得機構２３は、データベース３を検索することにより、要求に応じた所望のデータを読み出し、この読み出したデータ（検索結果）をデータ送信機構２２へ出力する。

【００６３】データ送信機構２２は、上記所望のデータを、データ取得機構２３から取得すると共に（ステップＳ２０７）、この所望のデータを、上記ステップＳ２０２において確立されたコネクション（この場合は、プッシュ型のデータ提供のために確立しているコネクション）を介して、ブラウザ1へ送信する（ステップＳ２０８）。

【００６４】ブラウザ1は、サーバ2のデータ送信機構２２からのデータを受け取ると、サーバ2とのコネクションを切断する（ステップＳ２０９）。

【００６５】ステップＳ２０５において、コネクションが切断されている場合、中継処理部１００は、新しく確立されたコネクションのＩＤを記録すると共に（ステップＳ２１０）、ブラウザ1へプッシュヘッダを送信する

（ステップS211）。

【0066】この場合、プッシュ型によるデータ提供の最中に、プッシュ型のデータ提供のために確立しているコネクションが切断されて、ステップS202において、プル型のデータ提供のためのコネクションが確立したことを意味している。

【0067】ここまでの処理で、以降のプッシュ型のデータ送信を、ステップS202で確立されたコネクションを用いて実行できるようにするために、新しく確立されたコネクションのID が記録されたことになる。また、プル型のコネクション（すなわち、ステップS210で確立されたコネクション）が切断されないように、中継処理部100からブラウザ1へ、そのコネクションを介して、プッシュヘッダが送られる。

【0068】上記ステップS211が終了した場合、サーバ2においては、プッシュデータ選択機構24は、適切なタイミングで、どのデータをブラウザ1に送信するかを選択して、データ送信機構22に伝達する（ステップS212）。

【0069】データ送信機構22は、上記選択された所望のデータの検索をデータ取得機構23に依頼する。データ取得機構23は、データベース3を検索することにより、プッシュデータ選択機構24によって選択されたデータ（所望のデータ）を読み出して、データ送信機構22へ出力する。

【0070】データ送信機構22は、所望のデータ（検索結果）をデータ取得機構23から取得し（ステップS213）、この所望のデータを、上記ステップS210で確立されたコネクション（この場合は、プル型のデータ提供のために確立しているコネクション）を介してブラウザ1へ送信する（ステップS214）。

【0071】ステップS214においては、サーバ2から中継処理部100へデータが送信されて来るので、中継処理部100は、受信したデータをブラウザ1へ送信する（ステップS215）。このステップS215が終了した場合は、ステップS212に戻り、このステップ以降の処理が行われる。

【0072】なお、上記ステップS203において、中継処理部100は、プッシュ型サービス終了要求を受け取った場合には、現在、確立しているコネクション（すなわち、コネクション150A、150B）を切断する（ステップ216）。

【0073】この場合、プッシュ型のみのデータ提供の場合には、プッシュ型のデータ提供のために確立しているコネクションが切断されることになる。これに対し、プッシュ型によるデータ提供が中断されて、プル型によるデータ提供が行われた後、再度、中断されていたプッシュ型によるデータ提供が行われていた場合は、プル型のデータ提供時に確立したコネクションが切断されることになる。

【0074】次に、中継処理部100内の要求中継機構110の処理動作について、図4に示すフローチャートを参照して説明する。

【0075】要求中継機構110は、ブラウザ1からの要求を受信した場合には、中継処理部100とブラウザ1との間に新しくコネクション（すなわち、コネクション150A）が確立するので、その要求送信に用いられたコネクションのID を認識する（ステップS301）。

【0076】なお、プッシュ型データ提供サービス開始要求、又はプル型によるデータ送信要求のいずれかの要求があった場合に、コネクションが確立されるので、前者の送信に用いられたコネクションのID を「a1」とし、後者の送信に用いられたコネクションのID を「b1」とする。

【0077】要求中継機構110は、受信した要求が、プッシュ型データ提供サービス終了要求であるか否かを判断し（ステップS302）、該サービス終了要求でない場合は、受信した要求が、プッシュ型データ提供サービス開始要求であるか否かを判断する（ステップS303）。

【0078】ステップS303において、プッシュ型データ提供サービス開始要求の場合、要求中継機構110は、認識したコネクションのID（この例ではID＝a1）をプッシュID保存領域130に書き込むと共に（ステップS304）、そのサービス開始要求を一時的に保持する。

【0079】また、要求中継機構110は、予め保持しているプッシュヘッダをデータ中継機構140に送信すると共に（ステップS305）、受信した要求（プッシュ型データ提供サービス開始要求）をサーバ2に送信して（ステップS306）、処理を終了する。

【0080】このステップS306が終了した場合、中継処理部100とサーバ2との間にID＝a1のコネクション150Bが確立するので、サーバ2は、ブラウザ1に対してデータ提供を行うことができる。そして、サーバ2から送信されるプッシュ型によるデータ提供のデータは、ID＝a1のコネクション150B、中継処理部100内のデータ中継機構140、及びID＝a1のコネクション150Aを経て、ブラウザ1に入力される。

【0081】上記ステップS303において、受信された要求がプッシュ型データ提供サービス開始要求でない場合は、プル型によるデータ送信要求ということになるので、要求中継機構110は、ステップS301で認識したID（この例ではID＝b1）をプルID保存領域120に書き込むと共に（ステップS307）、プッシュID保存領域130を参照して、コネクションを維持していたか否かを判断する（ステップS308）。

【0082】このプッシュID保存領域130にID が

記録されている場合には、コネクションが維持されていることになる。この場合、プッシュ型によるデータ送信の最中に、プル型によるデータ送信要求があり、プッシュＩＤ保存領域１３０に記録されたＩＤのコネクション（この例では、ＩＤ＝ａ１のコネクション）は既に切断されて、新たなコネクション（この例では、ＩＤ＝ｂ１のコネクション）が張られていることを意味する。

【００８３】一方、プッシュＩＤ保存領域１３０に何も記録されていない場合（「空」の場合）は、コネクションは維持されていないこととなり、プル型によるデータ送信要求が行われるが、プッシュ型によるデータ送信は現在行われていないことを意味する。

【００８４】ステップＳ３０８において、コネクションが維持されていない場合は、上記ステップＳ３０６に進む。この場合は、プッシュ型によるデータ送信要求がサーバ2 に送信される。

【００８５】ステップＳ３０８において、コネクションが維持されている場合、要求中継機構１１０は、ステップＳ３０７で書き込んだＩＤと同一のＩＤ（この例では、ＩＤ＝ｂ１）を、プッシュＩＤ保存領域１３０に書き込むと共に（ステップＳ３０９）、予め保持しているプッシュヘッダをデータ中継機構１４０に送信する（ステップＳ３１０）。この例では、プッシュＩＤ保存領域１３０の保存内容は、ＩＤ＝ａ１からＩＤ＝ｂ１に更新される。

【００８６】ステップＳ３１０において送信されたプッシュヘッダは、データ中継機構１４０、ＩＤ＝ｂ１のコネクション１５０Ａを経て、ブラウザ1 に入力される。この結果、プル型によるデータ提供が終了した場合であっても、ブラウザ1 によってＩＤ＝ｂ１のコネクション（すなわち、ＩＤ＝ｂ１のコネクション１５０Ａ、１５０Ｂ）が切断されることはない。

【００８７】そして、ステップＳ３１０を終了した要求中継機構１１０は、ステップＳ３０６の処理、すなわち、保持しているプッシュ型データ提供サービス開始要求を、サーバ2 に送信する。

【００８８】この結果、サーバ2 からは中断していたプッシュ型によるデータ送信が再開されることになり、このデータは、ＩＤ＝ｂ１のコネクション１５０Ｂ、中継処理部１００のデータ中継機構１４０、及びＩＤ＝ｂ１のコネクション１５０Ａを経て、ブラウザ1 に入力される。

【００８９】ステップＳ３０２において、要求が、プッシュ型データ提供サービス終了要求の場合、要求中継機構１１０は、プッシュＩＤ保存領域１３０を参照して、その保存領域に記録されているＩＤ（この例では、ＩＤ＝ｂ１）のコネクションを切断すると共に（ステップＳ３１１）、プッシュＩＤ保存領域１３０を「空」にした後（ステップＳ３１２）、処理を終了する。ステップＳ３１１においては、ＩＤ＝ｂ１のコネクション１５０Ａ、１５０Ｂが切断される。

【００９０】次に、各データ提供方式のデータ提供における要求中継機構１１０の処理動作について説明する。

【００９１】タイプ1：［プッシュ型のみの場合］
ステップＳ３０１～Ｓ３０６、再度ステップＳ３０１、Ｓ３０２、ステップＳ３１１、及びＳ３１２の順で処理される。

【００９２】タイプ2：［プル型のみの場合］
ステップＳ３０１～Ｓ３０３、Ｓ３０７、Ｓ３０８、及びＳ３０６の順で処理される。

【００９３】タイプ3：［プッシュ型、プル型、プッシュ型の順の場合］
ケース1（プッシュ型）
ステップＳ３０１～Ｓ３０６の順、
ケース2（プル型）
再度ステップＳ３０１～Ｓ３０３、Ｓ３０７～Ｓ３１０、及びステップＳ３０６の順、
ケース3（プッシュ型）
再度ステップＳ３０１～Ｓ３０６、再度ステップＳ３０１、Ｓ３０２、Ｓ３１１、及びＳ３１２の順、のケース１～3 の順で処理される。

【００９４】なお、４回のステップＳ３０１の処理時における要求は、以下の通りである。１回目はプッシュ型データ提供サービス開始要求。２回目はプル型によるデータ送信要求。３回目は保持されているプッシュ型データ提供サービス開始要求。４回目は、プッシュ型データ提供サービス終了要求。

【００９５】ここで、上述した3 タイプのデータ提供時におけるプルＩＤ保存領域１２０、及びプッシュＩＤ保存領域１３０の記録内容の一例を、図5 に示す。

【００９６】ここでは、プッシュ型データ提供サービス開始要求の際に確立されるコネクションのＩＤを「ａ１」とし、プル型によるデータ送信要求の際に確立されるコネクションのＩＤを「ｂ１」としている。

【００９７】図5 において、符号４１０で示されるＩＤは、ステップＳ３０５において書き込まれ、ステップＳ３０８において参照される。符号４２０で示されるＩＤは、ステップＳ３０９において更新されたものである。符号４３０で示されるＩＤは、ステップＳ３１２において更新されたものである（この場合は符号４２０で示されるＩＤと同一となる）。また、そのＩＤは、ステップＳ３１１において参照され、ステップＳ３１２において更新されるものである。

【００９８】次に、データ中継機構１４０の処理動作について、図6 に示すフローチャートを参照して説明する。

【００９９】データ中継機構１４０は、サーバ1 からのデータ、あるいは要求中継機構１１０からのプッシュヘッダを受信すると（ステップＳ５０１）、プルＩＤ保存領域１２０を参照して、その参照結果のＩＤを持つコネ

クションでブラウザ1 へのデータ送信を試み、そのデータ送信が成功したか否かを判断する(ステップS502)。

【0100】ステップS502 においてデータ送信に成功した場合には処理を終了する。これに対し、失敗した場合は、プルI D保存領域120を参照して得られたI Dで示されるコネクションは既に切断されていると考えられるので、データ中継機構140は、プッシュI D保存領域130に記録されているI Dで示されるコネクションを使用して、ブラウザ1 へのデータ送信を試み、そのデータ送信が成功したか否かを判断する(ステップS503)。

【0101】ステップS503 において、データ送信に成功した場合には処理を終了し、失敗した場合は、異常を知らせるメッセージを表示するなどの異常処理を行って(ステップS504)、処理を終了する。

【0102】続いて、複合型データ提供方式でデータを提供する際のコネクションの切り替わり前後における、中継処理部100 の処理例を、図7 に示すシーケンス図を参照して説明する。

【0103】この例においては、上述したタイプ3 の場合に対応しているので、コネクションのI Dは、図5 に示した内容となる。

【0104】[切替前の状態: 上記タイプ3 のケース1 の場合] この状態においては、上記タイプ3 のケース1 の場合に示した処理が実行されるので、以下の処理が行われる。

(1) : コネクションa 1 が維持される。

(2) : プッシュI D保存領域130 にコネクションa 1 のI Dが保存される。

(3) : サーバ1 はプッシュ型のデータ提供を行う。

【0105】従って、ブラウザ1 とサーバ2 間においては、図7 に示すように、サーバ2 から送信されたデータは、中継処理部100 のデータ中継機構140 に入力されて、図6 に示した様な処理が行われることにより、コネクションa 1 を介して、ブラウザ1 へ送信される(S610～630)。

【0106】つまり、この状態においては、コネクションa 1 によりプッシュ型のデータ提供が行われる。

【0107】[切替処理状態: 上記タイプ3 のケース2 の場合] ここでは、上記切替前の状態の時に、中継処理部100 は、ブラウザ1 からのプル型のデータ送信要求を受信して、コネクションb 1 が確立されたとする。すなわち、この状態においては、上記タイプ3 のケース2 の場合の処理が実行されるので、以下の処理が行われる。

(1) 要求中継機構110 によって、プルI D保存領域120 とプッシュI D保存領域130 の両方にコネクションb 1 のI Dが書き込まれる。

(2) 要求中継機構110 からデータ中継機構140 へプッシュヘッダが送信される。

(3) 要求中継機構110 からサーバ2 へプル型によるデータ送信要求が送信される。

【0108】従って、ブラウザ1 とサーバ2 間においては、図7 に示すように、ブラウザ1 から送信されたプル型によるデータ送信要求は、中継処理部100 の要求中継機構110 に入力されて、図6 に示したような処理が行われることにより、コネクションb 1 を介して、サーバ2 へ送信される(S640)。

【0109】また、要求中継機構110 からのプッシュヘッダ、及びサーバ2 からのプル型によるデータ送信要求に対するデータを受信したデータ中継機構140 は、これらのデータを、受信した順番でコネクションb 1 を使ってブラウザ1 に送信する(S650)。ここまでで、プル型のデータ提供が完了する。

【0110】つまり、この状態においては、プル型のデータ提供を行い、コネクションa 1 に代わってコネクションb 1 が確立される。

【0111】[切替後の状態: 上記タイプ3 のケース3 の場合] この状態においては、上記タイプ3 のケース3 の場合の処理が実行されるので、以下のような処理が行われる。

(1) コネクションb 1 が維持される。

(2) プッシュI D保存領域130 にはコネクションb 1 のI Dが保存される。

(3) 要求中継機構110 からサーバ2 へプッシュ型データ提供サービス開始要求が送信される。

【0112】よって、プッシュ型データ提供サービス開始要求を受信したサーバ2 は、図3 に示したステップS212～S214 の処理を実行することにより、再度、データを送信する。その送信データを受信した中継処理部100 のデータ中継機構140 は、コネクションb 1 を介して、ブラウザ1 へデータを送信する(S660、670)。

【0113】つまり、この状態においては、コネクションb 1 を使ってプッシュ型のデータ提供を行うようになる。

【0114】上述したように、本実施の形態によれば、ブラウザ1 とサーバ2 間に中継処理部100 (すなわち、データ中継装置60) を設けたことにより、複合型データ提供方式によるデータ提供を実施することができる。

【0115】すなわち、プッシュ型データ提供方式によるデータ提供の最中に、プル型データ提供方式によるデータ提供が行われて、プッシュ型データ提供方式によるデータ提供時のコネクションが切断された場合であっても、プル型データ提供方式によるデータ提供時のコネクションを使って、再度、中断していたプッシュ型データ提供方式によるデータ提供を継続することができる。

【0116】また、本実施の形態では、1 つのブラウザ

と1つのサーバとの間のデータ通信について説明したが、本実施の形態の応用例として、次のようにしても良い。すなわち、複数のブラウザにそれぞれ対応したプルID保存領域およびプッシュID保存領域を、中継処理部100内に設けるようにしても良い。

【0117】この場合、複数のブラウザそれぞれから送信されたプッシュ型データ提供サービス開始要求に応答したサーバからのデータ送信中に、当該複数のクライアントそれぞれからのプル型によるデータ送信要求がある場合、要求中継機構は、このデータ送信要求を送信したブラウザに対応するプルID保存領域およびプッシュID保存領域に、プル型データ提供方式によるデータ提供時に確立されたコネクションの識別情報を格納する。

【0118】そして、データ中継機構は、プッシュ型データ提供サービス開始要求を送信したブラウザに対応するプッシュID保存領域の記憶内容を参照し、この参照の結果得られた識別情報で示されるコネクションを介して、サーバからのプッシュ型データ提供方式による送信データを、該当するブラウザへ送信する。

【0119】なお、要求を発行する際には、発行元のアドレス番号等の識別情報と実際の要求内容とが送信されるので、プッシュ型データ提供サービス開始要求を受信したサーバは、容易にデータの送信相手(ブラウザのアドレス番号)を知ることができる。

【0120】従って、データ中継機構は、サーバから受け取ったデータを、このデータと共に送信されて来る送信相手のブラウザに対して、送信することができる。よって、この応用例によれば、複数のブラウザに対しても、プル型データ提供方式によるデータ提供の実施のために中断していた、プッシュ型データ提供方式によるデータ提供を、再開することができる。

【0121】さらには、本実施の形態において、上記処理の各手順を実行するためのプログラムは、CD-ROMなどのコンピュータ読み取り可能な記録媒体に格納して配布しても良い。

【0122】

【発明の効果】以上説明したように、本発明によれば、プッシュ型のデータ送信の最中に、プル型によるデータ送信が行われ、プッシュ型のデータ送信時のコネクションが切断された場合であっても、維持されているプル型によるデータ送信時のコネクションを使って、再度、プッシュ型のデータ送信を継続することができる。

【図面の簡単な説明】

【図1】本発明の実施の形態に係るデータ中継装置を有するデータ通信システムの構成を示す構成図である。

【図2】本発明の実施の形態に係るデータ中継装置を有するデータ通信システムを機能的に示した機能ブロック図である。

【図3】図2に示したデータ通信システムのデータ通信処理動作を示すフローチャートである。

【図4】図2に示したデータ中継装置における要求中継機構の処理動作を示すフローチャートである。

【図5】プルID保存領域およびプッシュID保存領域の記録内容の一例を説明するための図である。

【図6】図2に示したデータ中継装置におけるデータ中継機構の処理動作を示すフローチャートである。

【図7】ブラウザとサーバ間のデータ送受信を説明するためのシーケンス図である。

【図8】従来のデータ提供システムの構成を示すブロック図である。

【図9】図8に示したデータ提供システムにおいて、プル型データ提供方式によるデータ提供の様子を説明するための図である。

【図10】従来のプル型データ提供方式によるブラウザとサーバ間のデータ送受信を説明するためのシーケンス図である。

【図11】図8に示したデータ提供システムにおいて、プッシュ型データ提供方式によるデータ提供の様子を説明するための図である。

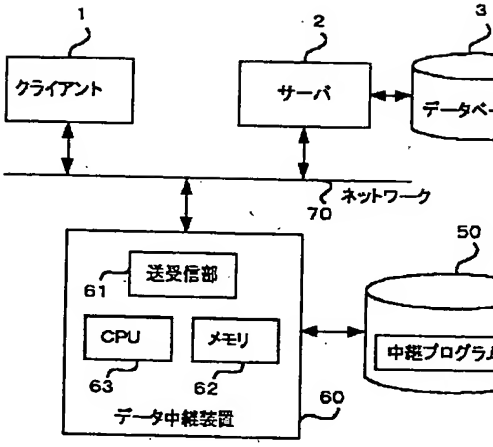
【図12】従来のプッシュ型データ提供方式によるブラウザとサーバ間のデータ送受信を説明するためのシーケンス図である。

【図13】図8に示したデータ提供システムにおいて、プル型データ提供方式とプッシュ型データ提供方式とを組み合わせて、データ提供を実施した場合の処理動作を説明するためのシーケンス図である。

【符号の説明】

1	クライアント(ブラウザ)
2	サーバ
3	データベース
50	2次記憶装置
60	データ中継装置
61	送受信部
62	メモリ
63	中央処理装置(CPU)
70	ネットワーク
100	中継処理部
110	要求中継機構
120	プルID保存領域
130	プッシュID保存領域
140	データ中継機構
150A、150B	コネクション

【 図1 】



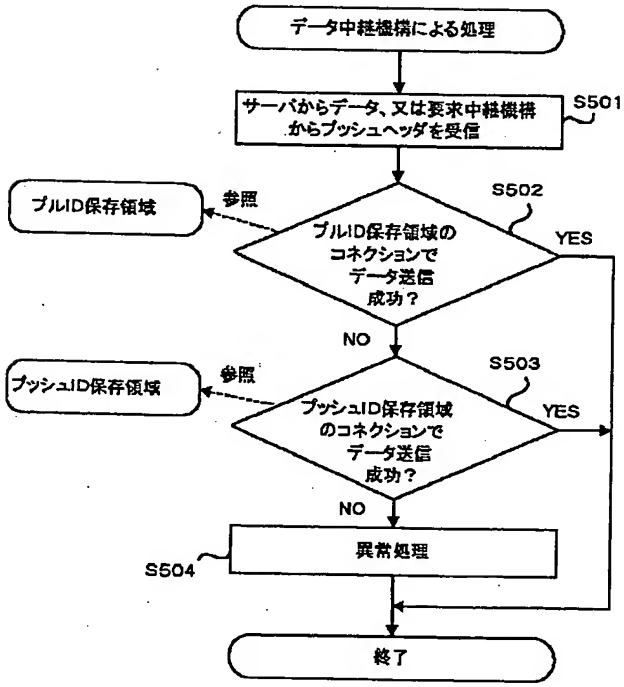
【 図5 】

データ提供方式＼保存領域	プルID保存領域 (120)	プッシュID保存領域 (130)
プッシュ型	空	a1
プル型	b1	空
プッシュ型	空	a1 (410)
↓ プル型	b1	b1 (420)
↓ プッシュ型	b1	b1 (430)

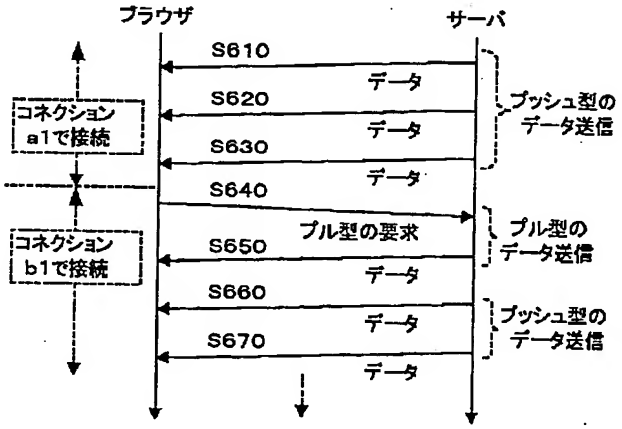
プッシュ型:コネクションID＝a1

プル型:コネクションID＝b1

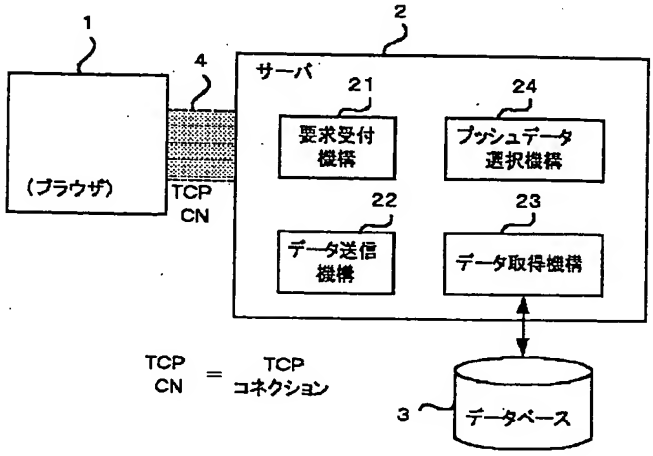
【 図6 】



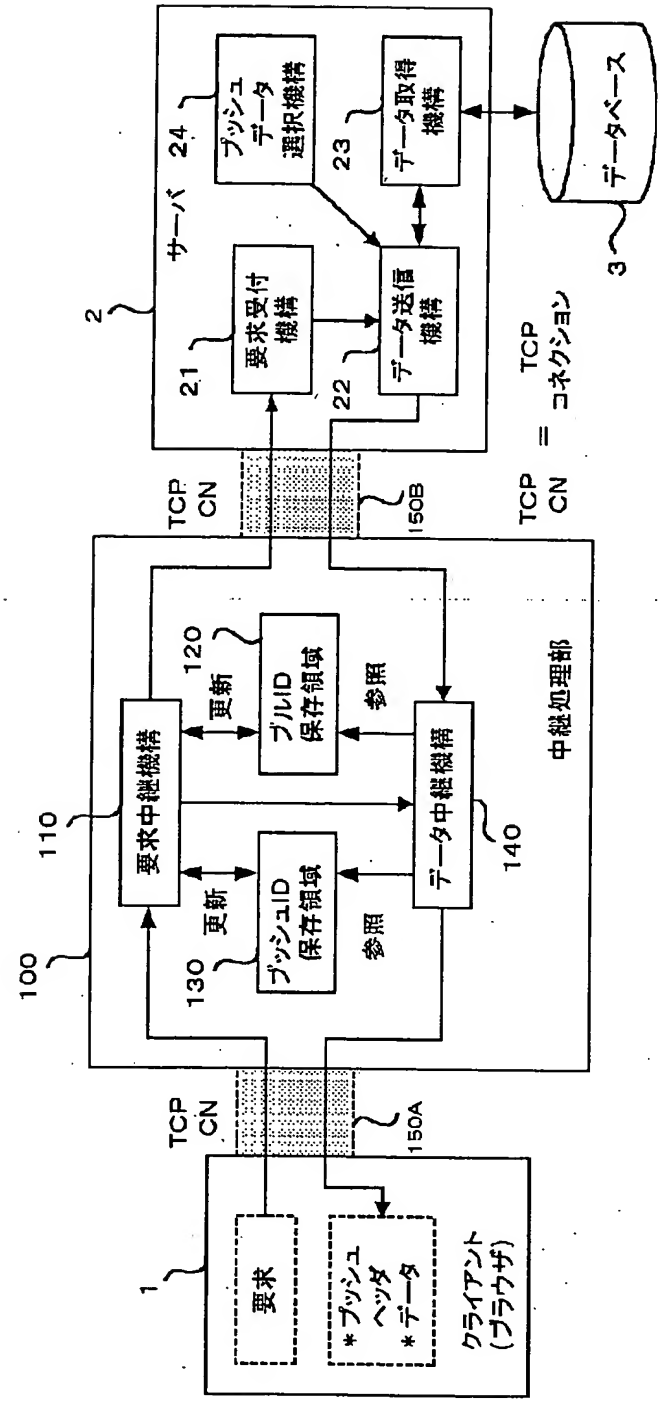
【 図7 】



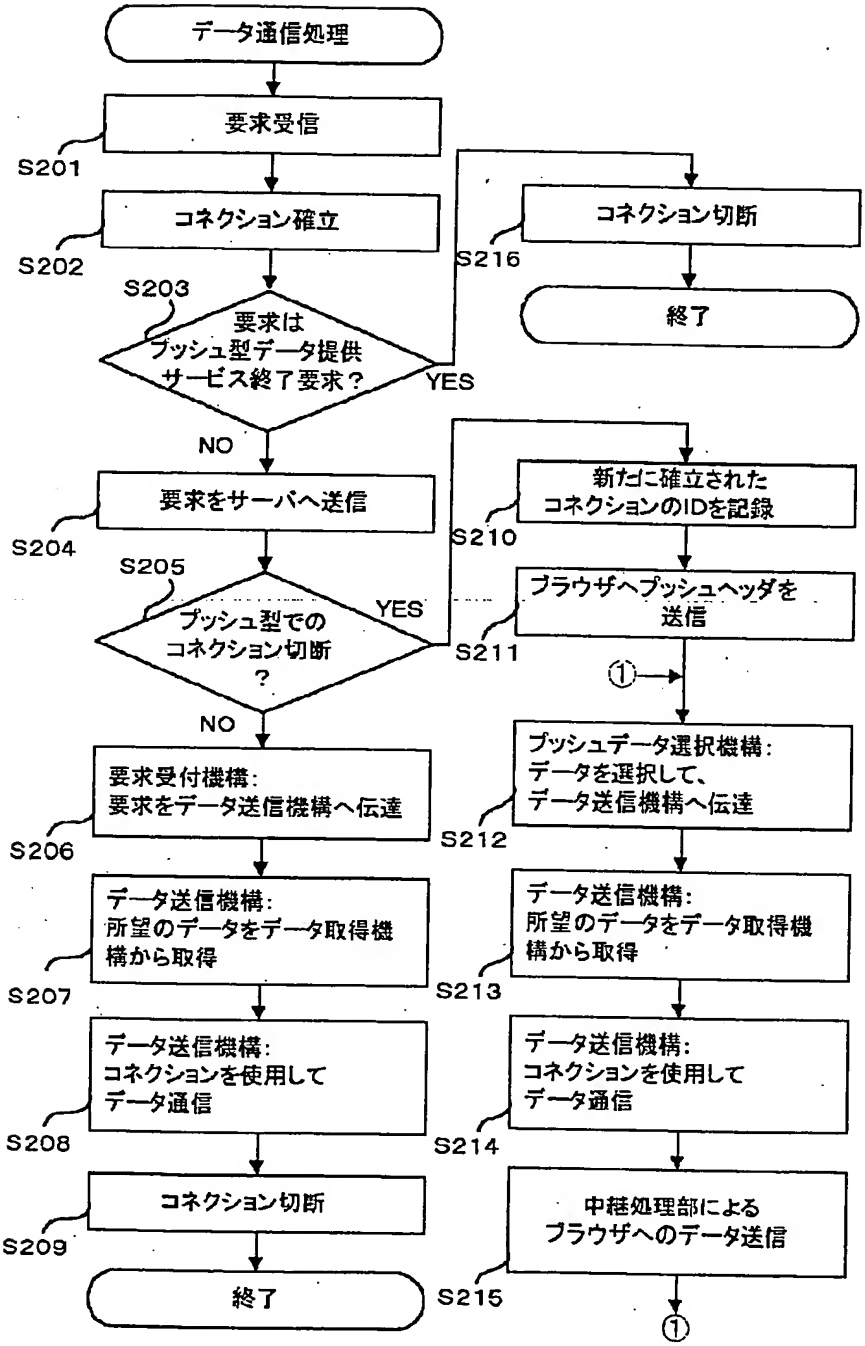
【 図8 】



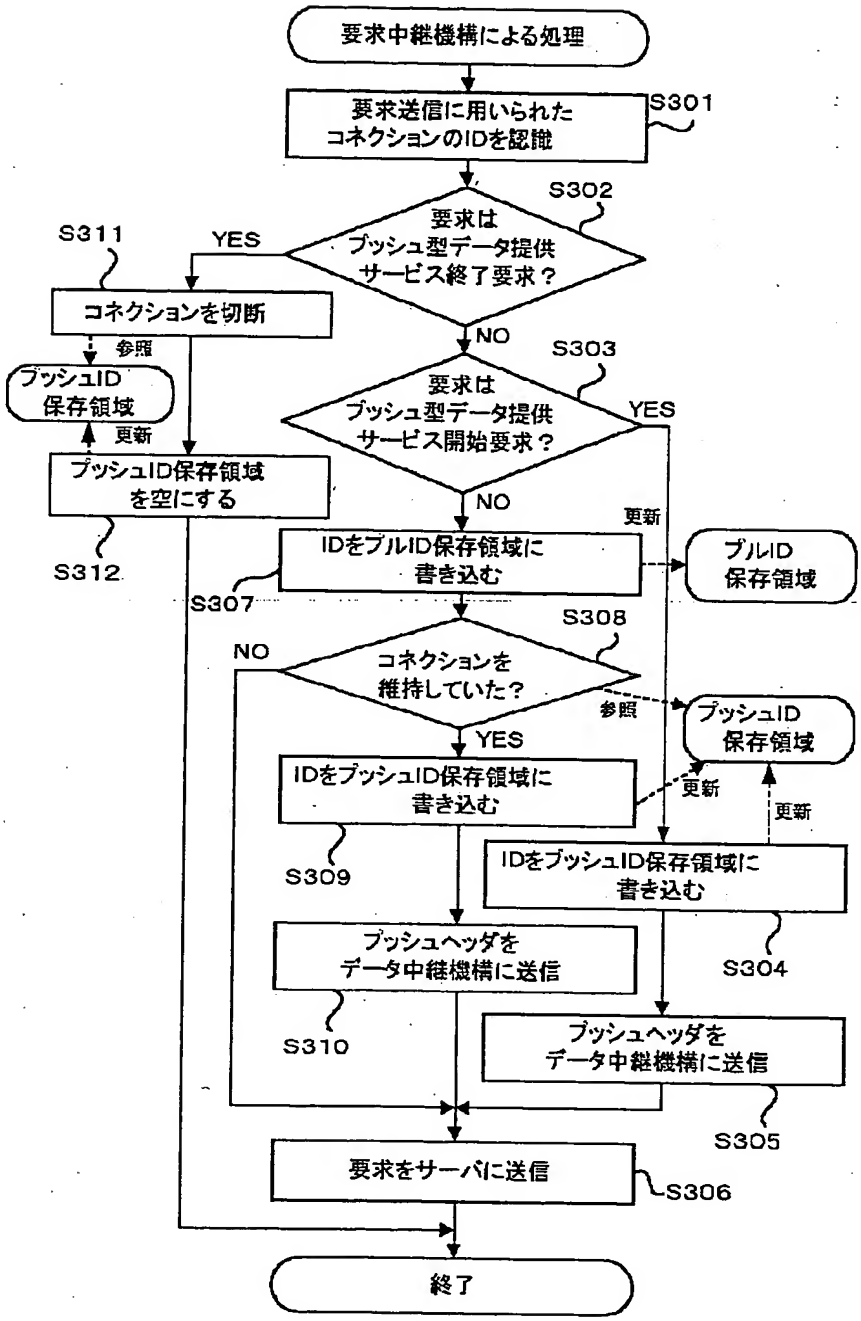
【 図2 】


クライアント
(ブラウザ)
1
要求
*プッシュ
ヘッダ
*データ
150A
TCP
CN
中継処理部
100
要求中継機構
110
更新
プルID
保存領域
120
参照
更新
プッシュID
保存領域
130
参照
データ中継機構
140
150B
TCP
CN
TCP
コネクション
サーバ
2
要求受付
機構
21
データ送信
機構
22
プッシュ
データ
選択機構
24
データ取得
機構
23
データベース
3

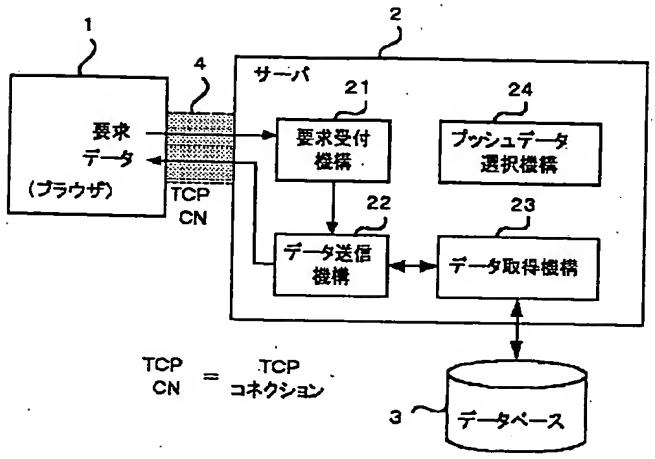
【 図3 】


データ通信処理
要求受信
S201
コネクション確立
S202
S203
要求は
プッシュ型データ提供
サービス終了要求？
YES
NO
コネクション切断
S216
終了
要求をサーバへ送信
S204
S205
プッシュ型での
コネクション切断
？
YES
NO
新たに確立された
コネクションのIDを記録
S210
ブラウザへプッシュヘッダを
送信
S211
①
要求受付機構：
要求をデータ送信機構へ伝達
S206
プッシュデータ選択機構：
データを選択して、
データ送信機構へ伝達
S212
データ送信機構：
所望のデータをデータ取得機
構から取得
S207
データ送信機構：
所望のデータをデータ取得機
構から取得
S213
データ送信機構：
コネクションを使用して
データ通信
S208
データ送信機構：
コネクションを使用して
データ通信
S214
コネクション切断
S209
中継処理部による
ブラウザへのデータ送信
S215
終了
①

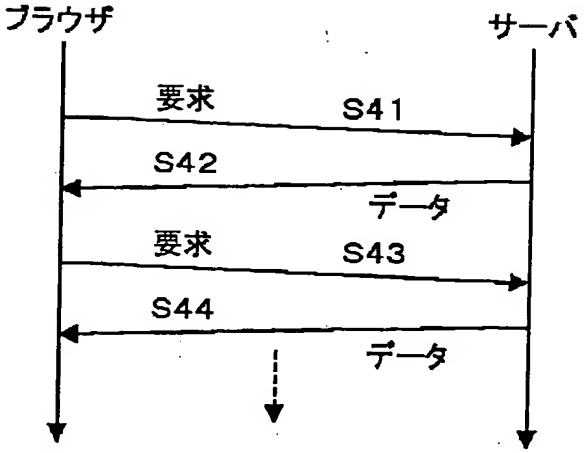
【 図4 】


要求中継機構による処理
要求送信に用いられた
コネクションのIDを認識
S301
S302
要求は
プッシュ型データ提供
サービス終了要求？
YES
S311
コネクションを切断
参照
プッシュID
保存領域
更新
プッシュID保存領域
を空にする
S312
NO
S303
要求は
プッシュ型データ提供
サービス開始要求？
YES
NO
更新
IDをプルID保存領域に
書き込む
S307
プルID
保存領域
S308
NO
コネクションを
維持していた？
参照
プッシュID
保存領域
YES
IDをプッシュID保存領域に
書き込む
更新
更新
S309
IDをプッシュID保存領域に
書き込む
S304
プッシュヘッダを
データ中継機構に送信
S310
プッシュヘッダを
データ中継機構に送信
S305
要求をサーバに送信
S306
終了

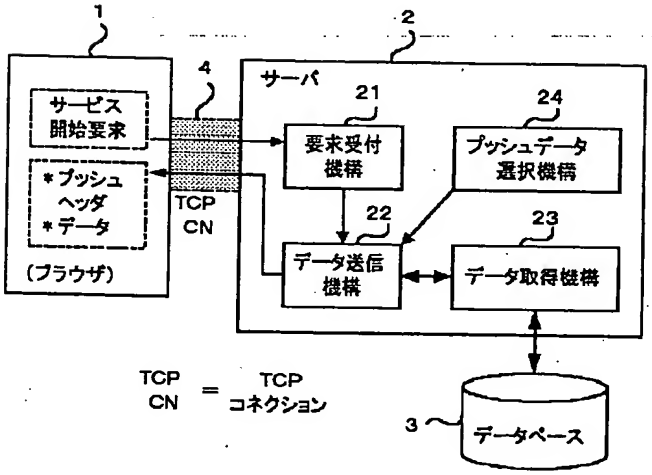
【図9】



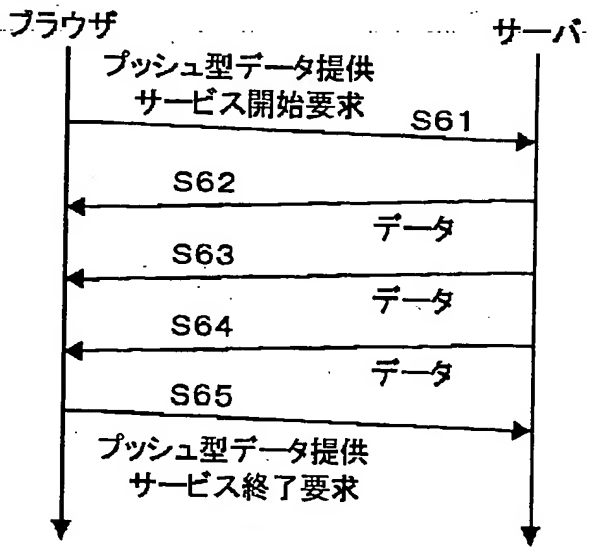
【図10】



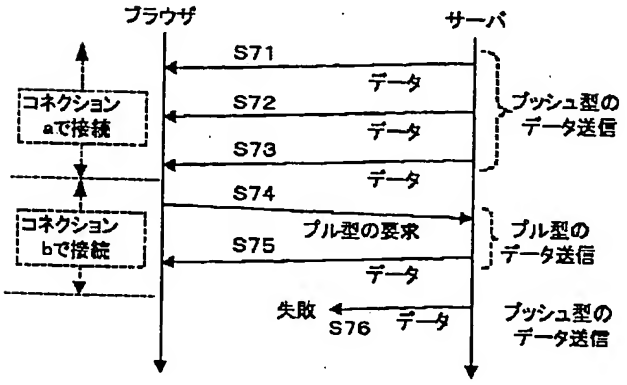
【図11】



【図12】



【図13】



フロント ページの続き

(72)発明者　横山　和俊
東京都江東区豊洲三丁目3 番3 号　株式会
社エヌ・ティ・ティ・データ内

Ｆターム (参考)　5B045 BB17 BB31 GG01 JJ28 JJ42
JJ45
5B089 GA00 GB04 HB02 JA21 JA33
JA36 JB14 KA00 KB06 KG03

PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2000-293452
(43)Date of publication of application : 20.10.2000

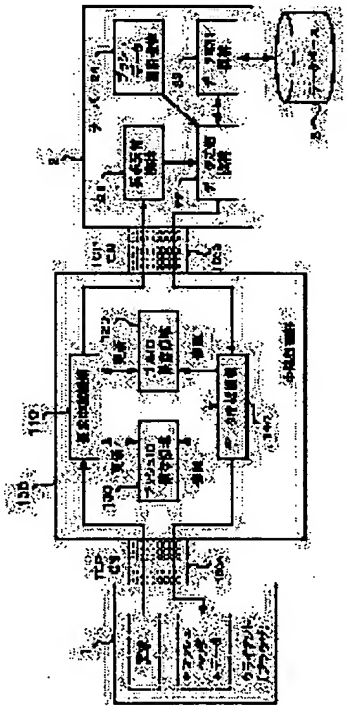
(51)Int.Cl. G06F 13/00
G06F 15/177

(21)Application number : 11-094471
(22)Date of filing : 01.04.1999

(71)Applicant : NTT DATA CORP
(72)Inventor : ISHIKAWA YUJI
SUDO MASANORI
YOKOYAMA KAZUTOSHI

(54) DATA REPEATING DEVICE, DATA COMMUNICATION SYSTEM, DATA COMMUNICATION METHOD AND RECORDING MEDIUM

(57)Abstract:
PROBLEM TO BE SOLVED: To obtain a data repeating device, a data communication system and a data communication method capable of continuously providing data based on the request of a client and providing data based on active decision of a server and to obtain a recording medium.
SOLUTION: When a data transmitting request of a pull type is given from a browser 1 while a server 2 provides data by a push type, connections 150 and 150B for transmitting data by the pull type are newly established. A data repeating mechanism 140 transmits a push header from a request repeating mechanism 110 to the browser 1 by using the newly established connection 150A. The browser 1 receiving transmitted data by the pull type keeps the newly established connection without disconnecting. The server 2 can restart providing of data by the push type by using the connections 150A and 150B.



LEGAL STATUS

[Date of request for examination]

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

2000-293452

CLAIMS

[Claim(s)]
[Claim 1] It connects with a client and this client through a network. A server equipped with the data transmitting function of a pull mold which transmits data according to the demand from a client, and the data transmitting function of the push type which transmits data to a client by active decision of self, In the network which connects said server and client, and the data transceiver system constituted more It is the data repeating installation for connecting with said server and client through a network, and transmitting and receiving data between said servers and clients. If said client outputs the Request to Send of the purport with a pull mold which should carry out data transmission while said server has transmitted data to the client by push type data transmission A transmitting means to answer a receiving means to receive this Request to Send, and said Request to Send, and to transmit the maintenance information on a purport that the connection established for the data transmission with a pull mold should be maintained to said client, Data repeating installation characterized by having a junction means to transmit and receive the transmit data based on the push type from said server, through said connection currently maintained by said client which received said maintenance information after the data transmission with said pull mold was completed.
[Claim 2] Said junction means is data repeating installation according to claim 1 characterized by what it has a storage means to memorize the identification information for identifying the connection established for the data transmission with a pull mold, and the data of the data transmission by the push type are transmitted and received for through the connection shown by said identification information.
[Claim 3] Said storage means is data repeating installation according to claim 2 characterized by what it has for two or more storage regions which memorize the identification information for identifying two or more connections of each established between two or more clients and said server for two or more clients of every concerned.
[Claim 4] A server equipped with the data transmitting function of a pull mold which is connected to a client through a network and transmits data according to the demand from a client, and the data transmitting function of the push type which transmits data to a client by active decision of self, If said client outputs the Request to Send of the purport with a pull mold which should carry out data transmission while said server has transmitted data to the client by push type data transmission A transmitting means to answer a receiving means to receive this Request to Send, and said Request to Send, and to transmit the maintenance information on a purport that the connection established for the data transmission with a pull mold should be maintained to said client, Said connection currently maintained by said client which received said maintenance information after the data transmission with said pull mold was completed is minded. The data telecommunication system characterized by what it has a junction means to transmit and receive the transmit data based on the push type from said server for.
[Claim 5] Said junction means is a data telecommunication system according to claim 4 characterized by what it has a storage means to memorize the identification information for identifying the connection established for the data transmission with a pull mold, and the data of the data transmission by the push type are transmitted and received for through the connection shown by said identification information.
[Claim 6] Said storage means is a data telecommunication system according to claim 5 characterized by what it has for two or more storage regions which memorize the identification information for identifying two or more connections of each established between two or more clients and said server for two or more clients of every concerned.
[Claim 7] It is the data communication approach in the data repeating installation which transmits and receives data between the servers and clients which carry out data transmission with a push type or a pull mold. The receiving step

to which said server receives the Request to Send of the purport with the pull mold from said client which should carry out data transmission during implementation of the data transmission by the push type, The transmitting step which transmits the maintenance information on a purport that the connection who answers the Request to Send received at said receiving step, and is established for the data transmission with a pull mold should be maintained to said client, The data communication approach characterized by including the junction step which transmits and receives the transmit data based on the push type from said server through said connection currently maintained by the client which received said maintenance information after the data transmission with said pull mold was completed.
[Claim 8] The reception function in which a server receives the Request to Send of the purport with the pull mold from a client which should carry out data transmission during implementation of the data transmission by the push type, The transmitting function which transmits the maintenance information on a purport that the connection who answers the Request to Send received by said reception function, and is established for the data transmission with a pull mold should be maintained to said client, Said connection currently maintained by the client which received said maintenance information after the data transmission with said pull mold was completed is minded. The record medium which is characterized by recording the program which performs the junction function which transmits and receives the transmit data based on the push type from said server and in which computer reading is possible.

[Translation done.]

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to the data repeating installation which transmits and receives data between the servers and clients which carry out data transmission with a push type or a pull mold, a data telecommunication system, the data communication approach, and a record medium.
[0002]
[Description of the Prior Art] The WWW (World Wide Web) browser (henceforth a browser) is known as a browser which displays the HTML (HyperText Markup Language: hypertext description language) document currently used in the client/server system etc.
[0003] The field where one HTML document is displayed in this browser is called frame. This browser functions as a client.
[0004] One browser can have two or more frames. By giving a demand to a server, each frame stretches the connection by TCP (Transmission Control Protocol), and delivers and receives data. In addition, the number of the connections whom one frame can stretch to coincidence is one.
[0005] There are two, a pull mold data offer method and a push type data offer method, in the method which offers data from a server to a browser.
[0006] A pull mold data offer method offers data based on the demand of a browser. The information for which a user asks is specified by this method. Generally, the server of WWW offers data by this method.
[0007] On the other hand, a push type data offer method provides a browser with data based on the active decision of a server. By this method, the information which a server transmits is chosen and a user receives it passively. As a technique for realizing a push type data offer method, the technique called a server push from Netscape is proposed (the page (http://home.netscape.com/assist/net-sites/pushpull.html) about the dynamic document of "** and a guide to HTML" (roller RIMEI work, **** Hiroyuki, Sadako Kuno, a Kuno ** translation, the Prentice Hall publication, 1995), and Netscape is known widely.).
[0008] In order to make data offer with a push type data offer method, the predetermined period and the connection need to be maintained. There is an approach called a server push as a means to maintain a connection, and it is mounted in some browsers. As an example of such a browser, there is "a product Netscape Navigator version1 and after one" of Netscape, and it has spread widely. In order to use the function of a server push of a browser, data as shown in a browser below from a server are transmitted.
[0009] Content-type: multipart/x-mixed-replace;boundary=BOUND--BOUND -- such data will be called push header in the following explanation.
[0010] Here, either of the two above-mentioned methods shows the example of the data offer structure of a system in which data offer is possible to drawing 8 .
[0011] This data offer system is equipped with the browser 1, the server 2, and the database 3. The server 2 is equipped with the demand reception device 21, the data transmitter style 22, the data acquisition device 23, and the push data optional feature 24. The connection 4 by TCP is established between a browser 1 and a server 2.
[0012] The data offer processing actuation by the pull mold data offer method in this data offer system is explained with reference to drawing 9 R> 9 and drawing 10 .

[0013] If the demand reception device 21 of a server 2 receives the demand transmitted from the browser 1 as shown in drawing 10 (S41), a connection 4 will be established between a browser 1 and a server 2.
[0014] And in a server 2, the demand reception device 21 transmits the demand from the browser 1 which received to the data transmitter style 22. The data transmitter style 22 requests retrieval of the data according to a demand from the data acquisition device 23. The data acquisition device 23 reads the data according to the contents of a request from a database 3, and passes them to the data transmitter style 22. The data transmitter style 22 transmits the retrieval result by the data acquisition device 23 to a browser 1 through a connection 4 (S42).
[0015] A browser 1 cuts the connection 4 established, when the data from a server 2 are received. And processing mentioned above when the next demand was transmitted from a browser 1, and same processing are performed (S43, S44).
[0016] Next, in a data offer system, the data offer processing actuation by the push type data offer method is explained with reference to drawing 11 and drawing 12 .
[0017] If the demand reception device 21 of a server 2 receives the push type data offer service initiation demand transmitted from the browser 1 as shown in drawing 12 (S61), a connection will be established between a browser 1 and a server 2.
[0018] In a server 2, the demand reception device 21 transmits the Request to Send of a push header to the data transmitter style 22, when a push type data offer service initiation demand is received. The data transmitter style 22 requests retrieval of a push header from the data acquisition device 23. The data acquisition device 23 reads a push header from a database 3, and passes it to the data transmitter style 22. The data transmitter style 22 transmits the received push header to a browser 1 through a connection 4 (S62).
[0019] In this or subsequent ones, a server 2 transmits this data to a browser 1 through a connection 4 while self reads the data determined actively from a database 3 until it receives the push type service termination demand from a browser 1 (S63, S64).
[0020] That is, the push data optional feature 24 is suitable timing, chooses which data are transmitted to a browser 1, and transmits this selection result to the data transmitter style 22. The data transmitter style 22 requests retrieval of a selection result (desired data) from the data acquisition device 23. The data acquisition device 23 searches a database 3, and passes the retrieval result to the data transmitter style 22. The data transmitter style 22 transmits the received retrieval result to a browser 1 through a connection 4.
[0021] And a server 2 will cut the established connection, if the push type data offer service termination demand from a browser 1 is received (S65).
[0022]
[Problem(s) to be Solved by the Invention] However, in the above-mentioned conventional data offer system, although data offer by the method of either a pull mold data offer method or a push type data offer method can be carried out, in making data offer combining two methods, the following problems occur.
[0023] As shown in drawing 13 , he is a connection (here) between a browser 1 and a server 2. this -- Connection a -- carrying out -- the midst in which is established and the server 2 is making data offer by the push type -- (S71, S72, S73) -- A connection new between (S74), a browser 1, and a server 2 when the demand of data offer of a pull mold is transmitted to a server 2 from a browser 1 (here) this -- Connection b -- carrying out -- it is established and the data (data based on data offer of a pull mold) according to the demand are transmitted to a browser 1 from a server 2 (S75).

[0024] Since only one connection can stretch on one frame, the above-mentioned connection a is cut by the browser 1 at the time of the data offer demand of a pull mold. Moreover, a browser 1 will cut the above-mentioned connection b, if the data offered by the data offer method of a pull mold are received. Consequently, it means that Connection a and Connection b were cut.
[0025] However, in a server 2, since a push type service termination demand is not transmitted from a browser 1, after ending data offer processing of a pull mold, the data which self determined are transmitted to a browser 1 that data offer by the interrupted push type should be resumed (S76).
[0026] However, since the connection is not established, the data transmission by the push type is failing. That is, since a server 2 loses all the connections to a frame, data offer of a push type is uncontinuable.
[0027] Thus, in the conventional data offer system, the demand of data offer of a pull mold occurred, and after

answering this demand and making data offer, the problem that interrupted data offer of a push type was uncontinuable was in the midst which is making data offer by the push type.
[0028] Then, the purpose of this invention is to offer the data repeating installation which can perform continuously data offer based on the demand of a client, and data offer based on the active decision of a server, a data telecommunication system, the data communication approach, and a record medium.
[0029]
[Means for Solving the Problem] In order to attain the above-mentioned purpose, the data repeating installation concerning the 1st viewpoint of this invention It connects with a client and this client through a network. A server equipped with the data transmitting function of a pull mold which transmits data according to the demand from a client, and the data transmitting function of the push type which transmits data to a client by active decision of self, In the network which connects said server and client, and the data transceiver system constituted more It is the data repeating installation for connecting with said server and client through a network, and transmitting and receiving data between said servers and clients. If said client outputs the Request to Send of the purport with a pull mold which should carry out data transmission while said server has transmitted data to the client by push type data transmission A transmitting means to answer a receiving means to receive this Request to Send, and said Request to Send, and to transmit the maintenance information on a purport that the connection established for the data transmission with a pull mold should be maintained to said client, After the data transmission with said pull mold is completed, it is characterized by what it has a junction means to transmit and receive the transmit data based on the push type from said server for through said connection currently maintained by said client which received said maintenance information.
[0030] In such data repeating installation, even if it is the case where the connection at the time of data transmission of a push type is cut, data transmission of a push type is continuable [data transmission with a pull mold is performed to the midst of data transmission of a push type, and] again using the connection at the time of the data transmission with the pull mold currently maintained.
[0031] Said junction means is equipped with a storage means to memorize the identification information for identifying the connection established for the data transmission for example, with a pull mold, and you may make it transmit and receive the data of the data transmission by the push type through the connection shown by said identification information.
[0032] In this case, a junction means will transmit the received data to a client through the connection (connection established at the time of the data transmission with a pull mold) shown by the identification information read with reference to the contents of storage of a storage means, if the data of the data transmission by the push type are received from a server. Therefore, the data transmission by the push type interrupted for implementation of the data transmission with a pull mold can be made to resume.
[0033] Moreover, you may make it said storage means equipped with two or more storage regions which memorize the identification information for identifying two or more connections of each established between two or more clients and said server for two or more clients of every concerned. The data transmission by the push type interrupted for two or more clients of every for implementation of the data transmission with a pull mold can be made to resume like the above also in this case.
[0034] In order to attain the above-mentioned purpose, the data telecommunication system concerning the 2nd viewpoint of this invention A server equipped with the data transmitting function of a pull mold which is connected to a client through a network and transmits data according to the demand from a client, and the data transmitting function of the push type which transmits data to a client by active decision of self, If said client outputs the Request to Send of the purport with a pull mold which should carry out data transmission while said server has transmitted data to the client by push type data transmission A transmitting means to answer a receiving means to receive this Request to Send, and said Request to Send, and to transmit the maintenance information on a purport that the connection established for the data transmission with a pull mold should be maintained to said client, After the data transmission with said pull mold is completed, it is characterized by having a junction means to transmit and receive the transmit data based on the push type from said server, through said connection currently maintained by said client which received said maintenance information.
[0035] Said junction means is equipped with a storage means to memorize the identification information for

identifying the connection established for the data transmission for example, with a pull mold, and transmits and receives the data of the data transmission by the push type through the connection shown by said identification information.
[0036] Moreover, said storage means may be equipped with two or more storage regions which memorize the identification information for identifying two or more connections of each established between two or more clients and said server for two or more clients of every concerned.
[0037] In order to attain the above-mentioned purpose, the data communication approach concerning the 3rd viewpoint of this invention It is the data communication approach in the data repeating installation which transmits and receives data between the servers and clients which carry out data transmission with a push type or a pull mold. The receiving step to which said server receives the Request to Send of the purport with the pull mold from said client which should carry out data transmission during implementation of the data transmission by the push type, The transmitting step which transmits the maintenance information on a purport that the connection who answers the Request to Send received at said receiving step, and is established for the data transmission with a pull mold should be maintained to said client, After the data transmission with said pull mold is completed, it is characterized by including the junction step which transmits and receives the transmit data based on the push type from said server through said connection currently maintained by the client which received said maintenance information.
[0038] In order to attain the above-mentioned purpose, the record medium concerning the 4th viewpoint of this invention in which computer reading is possible The reception function in which a server receives the Request to Send of the purport with the pull mold from a client which should carry out data transmission during implementation of the data transmission by the push type, The transmitting function which transmits the maintenance information on a purport that the connection who answers the Request to Send received by said reception function, and is established for the data transmission with a pull mold should be maintained to said client, Said connection currently maintained by the client which received said maintenance information after the data transmission with said pull mold was completed is minded. It is characterized by recording the program which performs the junction function which transmits and receives the transmit data based on the push type from said server.
[0039]
[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained with reference to a drawing.
[0040] Drawing 1 is the block diagram showing the configuration of the data telecommunication system which has the data repeating installation concerning the gestalt of operation of this invention.
[0041] This data telecommunication system has a client (browser) 1, the server 2 to which secondary storage, such as a hard disk which stored the database 3, was connected, and the composition that ** was connected with the data repeating installation 60 to which the secondary storage 50, such as a hard disk, was connected in the network 70. In addition, in drawing 1 , the same sign is given to the component shown in drawing 8 , and the component which achieves the same function.
[0042] The program (let this be a relay program) for performing data communication processing (data communication facility) by the data offer method of the compound die which combined the data offer method of a push type and a pull mold is stored in secondary storage 50.
[0043] The data repeating installation 60 transmits and receives data between a client 1 and a server 2, and is equipped with the transceiver section 61, memory 62, and a central processing unit (henceforth CPU) 63.
[0044] The transceiver section 61 transmits and receives data between a client 1 and a server 2 through a network 70.
[0045] The storage region and work area which memorize the above-mentioned relay program loaded from secondary storage 50 are established in memory 62.
[0046] CPU63 performs data communication processing by the above-mentioned compound-die data offer method by loading and performing the above-mentioned relay program in memory 62 from secondary storage 50 while controlling the whole equipment. About the detail of the data communication processing by this compound-die data offer method, it mentions later.
[0047] Drawing 2 is the functional block diagram having shown functionally the data telecommunication system which has the data repeating installation concerning the gestalt of operation of this invention. As shown in drawing 2 , this data telecommunication system has the composition of having added the junction processing section 100 between

the browser 1 and the server 2, in the conventional structure of a system shown in drawing 8 . In addition, in drawing 2 , the same sign is given to the component shown in drawing 8 R> 8, and the component which achieves the same function.

[0048] Data repeating installation 60 is realized by performing the above-mentioned relay program read from secondary storage 50, and the junction processing section 100 consists of the demand junction device 110, a pull ID saved area 120, a push ID saved area 130, and a data junction device 140.

[0049] If a demand (data Request to Send) is received from a browser 1, the demand junction device 110 will pass the demand to a server 2, after it performs predetermined processing. In addition, the push header which is fixed length data is held beforehand at the demand junction device 110.

[0050] Moreover, the demand junction device 110 holds the initiation demand temporarily until it receives a push type data offer service termination demand, when a push type data offer service initiation demand is received.

[0051] After data offer of a push type is interrupted when there is a data Request to Send of the pull mold from a browser 1 while, as for this, the server 2 carried out data offer by the push type, data offer of a pull mold is carried out. This is because the demand junction device 110 is required to transmit a push type data offer service initiation demand to a server 2 when it makes a server 2 resume data offer of a push type after that.

[0052] Here, when the demand junction device 110 receives the demand from a browser 1, connection 150A by TCP mentioned above between a browser 1 and the junction processing section 100 is established and a server 2 receives the demand from the demand junction device 110, connection 150B by TCP mentioned above between the junction processing section 100 and a server 2 is established. And the data offered from a server 2 are inputted into a browser 1 through connection 150B, the junction processing section 100, and connection 150A.

[0053] Moreover, when a browser 1 cuts connection 150A, the junction processing section 100 cuts connection 150B. Furthermore, the junction processing section 100 may cut both the connections 150A and 150B. About this, it mentions later.

[0054] Therefore, in explanation after this, when [both] it means having established Connections 150A and 150B in [both] saying, "A connection is established" and says, "A connection cuts", it means that Connections 150A and 150B are cut.

[0055] The pull ID saved area 120 is a storage region for saving the identification information (henceforth ID) of the connection established by transmission of a demand of data offer with a pull mold. The connection shown by ID saved to this field does not restrict always connecting, but also when already cut, he is possible.

[0056] As an example of the above-mentioned connection's ID, when the socket is being used as API (Application Program Interface), a socket number is used.

[0057] The push ID saved area 130 is a storage region for holding a connection's (namely, connection 150A) ID currently maintained between current and a browser 1. When there is no connection, the push ID field 130 "is emptied." On the other hand, when ID is saved in the push ID saved area 130, a system guarantees that the connection is established.

[0058] The data junction device 140 will transmit data or a push header to a browser 1 using current and the connection currently maintained between browsers 1, if the push header from the data or the demand junction device 110 from a server 2 is received.

[0059] Next, the data communication processing by the compound-die data offer method of the data telecommunication system of a configuration of starting is explained with reference to the flow chart shown in drawing 3 R> 3.

[0060] If the junction processing section 100 receives the demand transmitted from the browser 1 (step S201), a connection (namely, connections 150A and 150B) will be established between a browser 1 and a server 2 (step S202).

[0061] The demand which received judges whether it is a push type data offer service termination demand (step S203), and the junction processing section 100 judges whether the connection established for data offer of a push type was cut while transmitting the demand which received to a server 2 (step S204), when it is not the demand (step S205).

[0062] In step S205, when the connection is not cut, in a server 2, the demand reception device 21 transmits the received demand to the data transmitter style 22 (step S206). The data transmitter style 22 requests retrieval of the data of the request according to a demand from the data acquisition device 23. By searching a database 3, the data acquisition device 23 reads the desired data according to a demand, and outputs this read data (retrieval result) to the

data transmitter style 22.
[0063] The data transmitter style 22 transmits the data of this request to a browser 1 through the connection (in this case, connection established for data offer of a push type) established in the above-mentioned step S202 while acquiring the data of the above-mentioned request from the data acquisition device 23 (step S207) (step S208).
[0064] A browser 1 will cut a connection with a server 2, if the data from the data transmitter style 22 of a server 2 are received (step S209).
[0065] In step S205, when the connection is cut, the junction processing section 100 transmits a push header to a browser 1 while recording a connection's ID established newly (step S210) (step S211).
[0066] In this case, the connection established for data offer of a push type to the midst of data offer by the push type is cut, and it means that the connection for data offer of a pull mold was established in step S202.
[0067] In order to enable it to perform data transmission of subsequent push types by the processing so far using the connection established at step S202, it means that a connection's ID established newly was recorded. Moreover, a push header is sent to a browser 1 through the connection from the junction processing section 100 so that the connection (namely, connection established at step S210) of a pull mold may not be cut.
[0068] When the above-mentioned step S211 is completed, in a server 2, the push data optional feature 24 is suitable timing, chooses which data are transmitted to a browser 1, and transmits it to the data transmitter style 22 (step S212).
[0069] The data transmitter style 22 requests from the data acquisition device 23 retrieval of the data of the request by which selection was made [above-mentioned]. By searching a database 3, the data acquisition device 23 reads the data (desired data) chosen by the push data optional feature 24, and outputs them to the data transmitter style 22.
[0070] The data transmitter style 22 acquires desired data (retrieval result) from the data acquisition device 23 (step S213), and transmits the data of this request to a browser 1 through the connection (in this case, connection established for data offer of a pull mold) established at the above-mentioned step S210 (step S214).
[0071] In step S214, since data are transmitted to the junction processing section 100 from a server 2, the junction processing section 100 transmits the received data to a browser 1 (step S215). When this step S215 is completed, processing after return and this step is performed to step S212.
[0072] In addition, in the above-mentioned step S203, the junction processing section 100 cuts current and the established connection (namely, connections 150A and 150B), when a push type service termination demand is received (step 216).
[0073] In this case, the connection established for data offer of a push type will be cut at the case of data offer of only a push type. On the other hand, when data offer by the interrupted push type is again performed after data offer by the push type was interrupted and data offer with a pull mold was performed, the connection established at the time of data offer of a pull mold will be cut.
[0074] Next, processing actuation of the demand junction device 110 in the junction processing section 100 is explained with reference to the flow chart shown in drawing 4 .
[0075] Since a connection (namely, connection 150A) establishes the demand junction device 110 newly between the junction processing section 100 and a browser 1 when the demand from a browser 1 is received, a connection's ID used for the demand transmission is recognized (step S301).
[0076] In addition, since a connection is established when there is a demand of either a push type data offer service initiation demand or a data Request to Send with a pull mold, a connection's ID used for the former transmission is set to "a1", and a connection's ID used for the latter transmission is set to "b1."
[0077] In the demand junction device 110, the demand which received judges whether it is a push type data offer service termination demand (step S302), and when it is not this service termination demand, the demand which received judges [whether it is a push type data offer service initiation demand and] (step S303).
[0078] In step S303, while writing ID (this example ID=a1) of the connection who has recognized the demand junction device 110 in a push type data offer service initiation demand in the push ID saved area 130 (step S304), that service initiation demand is held temporarily.
[0079] Moreover, the demand junction device 110 transmits the demand (push type data offer service initiation demand) which received to a server 2 (step S306), and ends processing while it transmits the push header currently held beforehand to the data junction device 140 (step S305).
[0080] Since connection 150B of ID=a1 is established between the junction processing section 100 and a server 2

when this step S306 is completed, a server 2 can perform data offer to a browser 1. And the data of data offer by the push type transmitted from a server 2 are inputted into a browser 1 through the data junction device 140 in ID= connection 150B of a1 and the junction processing section 100, and connection 150A of ID=a1.
[0081] When the received demand is not a push type data offer service initiation demand in the above-mentioned step S303 Since it will be called a data Request to Send with a pull mold, the demand junction device 110 While writing ID (this example ID=b1) recognized at step S301 in the pull ID saved area 120 (step S307), with reference to the push ID saved area 130, it judges whether the connection was maintained or not (step S308).
[0082] The connection will be maintained when ID is recorded on this push ID saved area 130. In this case, it means that a data Request to Send with a pull mold is in the midst of the data transmission by the push type, the connection (this example connection of ID=a1) of ID recorded by the push ID saved area 130 is already cut, and a new connection (this example connection of ID=b1) is stretched.
[0083] On the other hand, although the connection will be maintained and a data Request to Send with a pull mold is performed when nothing is recorded on the push ID saved area 130 (in the case of "empty"), it means that data transmission by the push type is not performed now.
[0084] In step S308, when the connection is not maintained, it progresses to the above-mentioned step S306. In this case, the data Request to Send by the push type is transmitted to a server 2.
[0085] In step S308, when the connection is maintained, while the demand junction device 110 writes the same ID (this example ID=b1) as ID written in at step S307 in the push ID saved area 130 (step S309), the push header currently held beforehand is transmitted to the data junction device 140 (step S310). In this example, the contents of preservation of the push ID saved area 130 are updated by ID=b1 from ID=a1.
[0086] The push header transmitted in step S310 is inputted into a browser 1 through the data junction device 140 and connection 150A of ID=b1. Consequently, even if it is the case where data offer with a pull mold is completed, the connection (namely, connections 150A and 150B of ID=b1) of ID=b1 is not cut by the browser 1.
[0087] And the demand junction device 110 which ended step S310 transmits processing of step S306, i.e., the push type data offer service initiation demand currently held, to a server 2.
[0088] Consequently, from a server 2, the data transmission by the interrupted push type will be resumed, and this data is inputted into a browser 1 through connection 150B of ID=b1, the data junction device 140 of the junction processing section 100, and connection 150A of ID=b1.
[0089] In step S302, a demand ends processing, after "emptying" the push ID saved area 130 (step S312), while cutting the connection of ID (this example ID=b1) by which the demand junction device 110 is recorded on that saved area with reference to the push ID saved area 130 in a push type data offer service termination demand (step S311). In step S311, the connections 150A and 150B of ID=b1 are cut.
[0090] Next, processing actuation of the demand junction device 110 in data offer of each data offer method is explained.
[0091] Type 1: [the case of only a push type]
steps S301-S306 -- it is again processed in order of steps S301 and S302 and steps S311 and S312.
[0092] Type 2: [the case of only a pull mold]
Step S301- It is processed in order of S303, S307, S308, and S306.
[0093] Type 3: [the case of the order of a push type, a pull mold, and a push type]
Case 1 (push type)
The order of steps S301-S306, a case 2 (pull mold)
They are steps S301-S303, S307-S310 and the order of step S306, and a case 3 (push type) again.
again -- steps S301-S306 -- it is again processed in order of the cases 1-3 of order ** of steps S301, S302, S311, and S312.
[0094] In addition, the demand at the time of four processings of step S301 is as follows. The 1st time is a push type data offer service initiation demand. The 2nd time is a data Request to Send with a pull mold. The 3rd time is a push type data offer service initiation demand currently held. The 4th time is a push type data offer service termination demand.
[0095] Here, an example of the contents of record of the pull ID saved area 120 at the time of data offer of three types mentioned above and the push ID saved area 130 is shown in drawing 5 .

[0096] Here, a connection's ID established in the case of a push type data offer service initiation demand is set to "a1", and a connection's ID established in the case of a data Request to Send with a pull mold is set to "b1."
[0097] In drawing 5 , ID shown with a sign 410 is written in in step S305, and is referred to in step S308. ID shown with a sign 420 is updated in step S309. ID shown with a sign 430 is updated in step S312 (in this case, it becomes the same as that of ID shown with a sign 420). Moreover, the ID is referred to in step S311, and is updated in step S312.
[0098] Next, processing actuation of the data junction device 140 is explained with reference to the flow chart shown in drawing 6 .
[0099] The data junction device 140 judges whether when the push header from the data or the demand junction device 110 from a server 1 was received (step S501), with reference to the pull ID saved area 120, the data transmission to a browser 1 was tried through the connection with ID of the reference result, and the data transmission was successful (step S502).
[0100] Processing is ended when it succeeds in data transmission in step S502. On the other hand, since the connection shown by ID obtained with reference to the pull ID saved area 120 is considered to already be cut when it fails, the connection shown by ID currently recorded on the push ID saved area 130 is used for the data junction device 140, the data transmission to a browser 1 is tried, and it judges whether the data transmission was successful (step S503).
[0101] In step S503, when it succeeds in data transmission, processing is ended, when it fails, exception processing of displaying the message which tells abnormalities is performed (step S504), and processing is ended.
[0102] Then, a compound-die data offer method explains with reference to the sequence diagram the connection at the time of offering data changing, and showing the example of processing of the junction processing section 100 of order in drawing 7 .
[0103] In this example, since it corresponds in Type 3 mentioned above, a connection's ID serves as contents shown in drawing 5 .
[0104] [-- condition [before a change]: -- the case of the case 1 of the above-mentioned type 3 --] -- in this condition, since processing which was shown in the case of the case 1 of the above-mentioned type 3 is performed, the following processings are performed.
(1): A connection a1 is maintained.
(2): A connection's a1 ID is saved in the push ID saved area 130.
(3): A server 1 performs data offer of a push type.
[0105] Therefore, as shown in drawing 7 between a browser 1 and a server 2, the data transmitted from the server 2 are inputted into the data junction device 140 of the junction processing section 100, and it is transmitted to a browser 1 through a connection a1 by performing processing as shown in drawing 6 (S610-630).
[0106] That is, data offer of a push type is performed by the connection a1 in this condition.
[0107] [-- change processing-state: -- the case of the case 2 of the above-mentioned type 3 --] -- here, in the condition before the above-mentioned change, the junction processing section 100 receives the data Request to Send of the pull mold from a browser 1, and presupposes that the connection b1 was established. That is, in this condition, since processing in the case of the case 2 of the above-mentioned type 3 is performed, the following processings are performed.
(1) A connection's b1 ID is written by the demand junction device 110 in both the pull ID saved area 120 and the push ID saved area 130.
(2) A push header is transmitted to the data junction device 140 from the demand junction device 110.
(3) A data Request to Send with a pull mold is transmitted to a server 2 from the demand junction device 110.
[0108] Therefore, as shown in drawing 7 between a browser 1 and a server 2, the data Request to Send with the pull mold transmitted from the browser 1 is inputted into the demand junction device 110 of the junction processing section 100, and is transmitted to a server 2 through a connection b1 by performing processing as shown in drawing 6 (S640).
[0109] Moreover, the data junction device 140 in which the data to a data Request to Send with the push header from the demand junction device 110 and the pull mold from a server 2 were received is transmitted to a browser 1 using a connection b1 in the sequence which received these data (S650). Here, data offer of a pull mold is completed.
[0110] That is, in this condition, data offer of a pull mold is performed and a connection b1 is established instead of a connection a1.
[0111] [-- condition [after a change]: -- the case of the case 3 of the above-mentioned type 3 --] -- in this condition,

since processing in the case of the case 3 of the above-mentioned type 3 is performed, the following processings are performed.
(1) A connection b1 is maintained.
(2) A connection's b1 ID is saved in the push ID saved area 130.
(3) A push type data offer service initiation demand is transmitted to a server 2 from the demand junction device 110.
[0112] Therefore, the server 2 which received the push type data offer service initiation demand transmits data again by performing processing of steps S212-S214 shown in drawing 3 . The data junction device 140 of the junction processing section 100 which received the transmit data transmits data to a browser 1 through a connection b1 (660 S 670).
[0113] That is, in this condition, it comes to perform data offer of a push type using a connection b1.
[0114] As mentioned above, according to the gestalt of this operation, data offer by the compound-die data offer method can be carried out by having formed the junction processing section 100 (namely, data repeating installation 60) between the browser 1 and the server 2.
[0115] That is, even if it is the case where the connection at the time of data offer by the push type data offer method is cut, data offer by the interrupted push type data offer method is continuable [data offer by the pull mold data offer method is performed to the midst of data offer by the push type data offer method, and] again using the connection at the time of data offer by the pull mold data offer method.
[0116] Moreover, although the gestalt of this operation explained the data communication between one browser and one server, you may make it be a degree as an application of the gestalt of this operation. That is, you may make it prepare the pull ID saved area and push ID saved area corresponding to two or more browsers in the junction processing section 100, respectively.
[0117] In this case, when a data Request to Send with the pull mold from two or more clients of each concerned is during the data transmission from the server which answered the push type data offer service initiation demand transmitted from two or more browsers of each, a demand junction device stores a connection's identification information established at the time of data offer by the pull mold data offer method in the pull ID saved area and the push ID saved area corresponding to the browser which transmitted this data Request to Send.
[0118] And a data junction device transmits the transmit data based on the push type data offer method from a server to the corresponding browser through the connection shown by the identification information obtained as a result of this reference with reference to the contents of storage of the push ID saved area corresponding to the browser which transmitted the push type data offer service initiation demand.
[0119] In addition, since identification information, such as an address number of a publishing agency, and the actual contents of a demand are transmitted in case a demand is published, the server which received the push type data offer service initiation demand can know the transmitting partner (address number of a browser) of data easily.
[0120] Therefore, a data junction device can be transmitted to the browser of the transmitting partner to whom the data received from the server are transmitted with this data. Therefore, according to this application, data offer by the push type data offer method interrupted for implementation of data offer by the pull mold data offer method can be resumed also to two or more browsers.
[0121] Furthermore, in the gestalt of this operation, the program for performing each procedure of the above-mentioned processing may be stored in the record medium which CD-ROM etc. can computer read, and may be distributed.
[0122]
[Effect of the Invention] As explained above, even if it is the case where the connection at the time of data transmission of a push type is cut, data transmission of a push type is continuable [data transmission with a pull mold is performed to the midst of data transmission of a push type, and] according to this invention, again using the connection at the time of the data transmission with the pull mold currently maintained.

[Translation done.]

TECHNICAL FIELD

[Field of the Invention] This invention relates to the data repeating installation which transmits and receives data between the servers and clients which carry out data transmission with a push type or a pull mold, a data telecommunication system, the data communication approach, and a record medium.

[Translation done.]

PRIOR ART

[Description of the Prior Art] The WWW (World Wide Web) browser (henceforth a browser) is known as a browser which displays the HTML (HyperText Markup Language: hypertext description language) document currently used in the client/server system etc.

[0003] The field where one HTML document is displayed in this browser is called frame. This browser functions as a client.

[0004] One browser can have two or more frames. By giving a demand to a server, each frame stretches the connection by TCP (Transmission Control Protocol), and delivers and receives data. In addition, the number of the connections whom one frame can stretch to coincidence is one.

[0005] There are two, a pull mold data offer method and a push type data offer method, in the method which offers data from a server to a browser.

[0006] A pull mold data offer method offers data based on the demand of a browser. The information for which a user asks is specified by this method. Generally, the server of WWW offers data by this method.

[0007] On the other hand, a push type data offer method provides a browser with data based on the active decision of a server. By this method, the information which a server transmits is chosen and a user receives it passively. As a technique for realizing a push type data offer method, the technique called a server push from Netscape is proposed (the page (http://home.netscape.com/assist/net-sites/pushpull.html) about the dynamic document of "** and a guide to HTML" (roller RIMEI work, **** Hiroyuki, Sadako Kuno, a Kuno ** translation, the Prentice Hall publication, 1995), and Netscape is known widely.).

[0008] In order to make data offer with a push type data offer method, the predetermined period and the connection need to be maintained. There is an approach called a server push as a means to maintain a connection, and it is mounted in some browsers. As an example of such a browser, there is "a product Netscape Navigator version1 and after one" of Netscape, and it has spread widely. In order to use the function of a server push of a browser, data as shown in a browser below from a server are transmitted.

[0009] Content-type: multipart/x-mixed-replace;boundary=BOUND--BOUND -- such data will be called push header in the following explanation.

[0010] Here, either of the two above-mentioned methods shows the example of the data offer structure of a system in which data offer is possible to drawing 8 .

[0011] This data offer system is equipped with the browser 1, the server 2, and the database 3. The server 2 is equipped with the demand reception device 21, the data transmitter style 22, the data acquisition device 23, and the push data optional feature 24. The connection 4 by TCP is established between a browser 1 and a server 2.

[0012] The data offer processing actuation by the pull mold data offer method in this data offer system is explained with reference to drawing 9 R> 9 and drawing 10 .

[0013] If the demand reception device 21 of a server 2 receives the demand transmitted from the browser 1 as shown in drawing 10 (S41), a connection 4 will be established between a browser 1 and a server 2.

[0014] And in a server 2, the demand reception device 21 transmits the demand from the browser 1 which received to the data transmitter style 22. The data transmitter style 22 requests retrieval of the data according to a demand from the data acquisition device 23. The data acquisition device 23 reads the data according to the contents of a request from a database 3, and passes them to the data transmitter style 22. The data transmitter style 22 transmits the retrieval result

by the data acquisition device 23 to a browser 1 through a connection 4 (S42).
[0015] A browser 1 cuts the connection 4 established, when the data from a server 2 are received. And processing mentioned above when the next demand was transmitted from a browser 1, and same processing are performed (S43, S44).
[0016] Next, in a data offer system, the data offer processing actuation by the push type data offer method is explained with reference to drawing 11 and drawing 12 .
[0017] If the demand reception device 21 of a server 2 receives the push type data offer service initiation demand transmitted from the browser 1 as shown in drawing 12 (S61), a connection will be established between a browser 1 and a server 2.
[0018] In a server 2, the demand reception device 21 transmits the Request to Send of a push header to the data transmitter style 22, when a push type data offer service initiation demand is received. The data transmitter style 22 requests retrieval of a push header from the data acquisition device 23. The data acquisition device 23 reads a push header from a database 3, and passes it to the data transmitter style 22. The data transmitter style 22 transmits the received push header to a browser 1 through a connection 4 (S62).
[0019] In this or subsequent ones, a server 2 transmits this data to a browser 1 through a connection 4 while self reads the data determined actively from a database 3 until it receives the push type service termination demand from a browser 1 (S63, S64).
[0020] That is, the push data optional feature 24 is suitable timing, chooses which data are transmitted to a browser 1, and transmits this selection result to the data transmitter style 22. The data transmitter style 22 requests retrieval of a selection result (desired data) from the data acquisition device 23. The data acquisition device 23 searches a database 3, and passes the retrieval result to the data transmitter style 22. The data transmitter style 22 transmits the received retrieval result to a browser 1 through a connection 4.
[0021] And a server 2 will cut the established connection, if the push type data offer service termination demand from a browser 1 is received (S65).

[Translation done.]

EFFECT OF THE INVENTION

[Effect of the Invention] As explained above, even if it is the case where the connection at the time of data transmission of a push type is cut, data transmission of a push type is continuable [data transmission with a pull mold is performed to the midst of data transmission of a push type, and] according to this invention, again using the connection at the time of the data transmission with the pull mold currently maintained.

[Translation done.]

TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] However, in the above-mentioned conventional data offer system, although data offer by the method of either a pull mold data offer method or a push type data offer method can be carried out, in making data offer combining two methods, the following problems occur.
[0023] As shown in drawing 13 , he is a connection (here) between a browser 1 and a server 2. this -- Connection a -- carrying out -- the midst in which is established and the server 2 is making data offer by the push type -- (S71, S72, S73) -- A connection new between (S74), a browser 1, and a server 2 when the demand of data offer of a pull mold is transmitted to a server 2 from a browser 1 (here) this -- Connection b -- carrying out -- it is established and the data (data based on data offer of a pull mold) according to the demand are transmitted to a browser 1 from a server 2 (S75).

[0024] Since only one connection can stretch on one frame, the above-mentioned connection a is cut by the browser 1 at the time of the data offer demand of a pull mold. Moreover, a browser 1 will cut the above-mentioned connection b, if the data offered by the data offer method of a pull mold are received. Consequently, it means that Connection a and Connection b were cut.
[0025] However, in a server 2, since a push type service termination demand is not transmitted from a browser 1, after ending data offer processing of a pull mold, the data which self determined are transmitted to a browser 1 that data offer by the interrupted push type should be resumed (S76).
[0026] However, since the connection is not established, the data transmission by the push type is failing. That is, since a server 2 loses all the connections to a frame, data offer of a push type is uncontinuable.
[0027] Thus, in the conventional data offer system, the demand of data offer of a pull mold occurred, and after answering this demand and making data offer, the problem that interrupted data offer of a push type was uncontinuable was in the midst which is making data offer by the push type.
[0028] Then, the purpose of this invention is to offer the data repeating installation which can perform continuously data offer based on the demand of a client, and data offer based on the active decision of a server, a data telecommunication system, the data communication approach, and a record medium.

MEANS

[Means for Solving the Problem] In order to attain the above-mentioned purpose, the data repeating installation concerning the 1st viewpoint of this invention It connects with a client and this client through a network. A server equipped with the data transmitting function of a pull mold which transmits data according to the demand from a client, and the data transmitting function of the push type which transmits data to a client by active decision of self, In the network which connects said server and client, and the data transceiver system constituted more It is the data repeating installation for connecting with said server and client through a network, and transmitting and receiving data between said servers and clients. If said client outputs the Request to Send of the purport with a pull mold which should carry out data transmission while said server has transmitted data to the client by push type data transmission A transmitting means to answer a receiving means to receive this Request to Send, and said Request to Send, and to transmit the maintenance information on a purport that the connection established for the data transmission with a pull mold should be maintained to said client, After the data transmission with said pull mold is completed, it is characterized by what it has a junction means to transmit and receive the transmit data based on the push type from said server for through said connection currently maintained by said client which received said maintenance information.

[0030] In such data repeating installation, even if it is the case where the connection at the time of data transmission of a push type is cut, data transmission of a push type is continuable [data transmission with a pull mold is performed to the midst of data transmission of a push type, and] again using the connection at the time of the data transmission with the pull mold currently maintained.

[0031] Said junction means is equipped with a storage means to memorize the identification information for identifying the connection established for the data transmission for example, with a pull mold, and you may make it transmit and receive the data of the data transmission by the push type through the connection shown by said identification information.

[0032] In this case, a junction means will transmit the received data to a client through the connection (connection established at the time of the data transmission with a pull mold) shown by the identification information read with reference to the contents of storage of a storage means, if the data of the data transmission by the push type are received from a server. Therefore, the data transmission by the push type interrupted for implementation of the data transmission with a pull mold can be made to resume.

[0033] Moreover, you may make it said storage means equipped with two or more storage regions which memorize the identification information for identifying two or more connections of each established between two or more clients and said server for two or more clients of every concerned. The data transmission by the push type interrupted for two or more clients of every for implementation of the data transmission with a pull mold can be made to resume like the above also in this case.

[0034] In order to attain the above-mentioned purpose, the data telecommunication system concerning the 2nd viewpoint of this invention A server equipped with the data transmitting function of a pull mold which is connected to a client through a network and transmits data according to the demand from a client, and the data transmitting function of the push type which transmits data to a client by active decision of self, If said client outputs the Request to Send of the purport with a pull mold which should carry out data transmission while said server has transmitted data to the client by push type data transmission A transmitting means to answer a receiving means to receive this Request to

Send, and said Request to Send, and to transmit the maintenance information on a purport that the connection established for the data transmission with a pull mold should be maintained to said client, After the data transmission with said pull mold is completed, it is characterized by having a junction means to transmit and receive the transmit data based on the push type from said server, through said connection currently maintained by said client which received said maintenance information.

[0035] Said junction means is equipped with a storage means to memorize the identification information for identifying the connection established for the data transmission for example, with a pull mold, and transmits and receives the data of the data transmission by the push type through the connection shown by said identification information.

[0036] Moreover, said storage means may be equipped with two or more storage regions which memorize the identification information for identifying two or more connections of each established between two or more clients and said server for two or more clients of every concerned.

[0037] In order to attain the above-mentioned purpose, the data communication approach concerning the 3rd viewpoint of this invention It is the data communication approach in the data repeating installation which transmits and receives data between the servers and clients which carry out data transmission with a push type or a pull mold. The receiving step to which said server receives the Request to Send of the purport with the pull mold from said client which should carry out data transmission during implementation of the data transmission by the push type, The transmitting step which transmits the maintenance information on a purport that the connection who answers the Request to Send received at said receiving step, and is established for the data transmission with a pull mold should be maintained to said client, After the data transmission with said pull mold is completed, it is characterized by including the junction step which transmits and receives the transmit data based on the push type from said server through said connection currently maintained by the client which received said maintenance information.

[0038] In order to attain the above-mentioned purpose, the record medium concerning the 4th viewpoint of this invention in which computer reading is possible The reception function in which a server receives the Request to Send of the purport with the pull mold from a client which should carry out data transmission during implementation of the data transmission by the push type, The transmitting function which transmits the maintenance information on a purport that the connection who answers the Request to Send received by said reception function, and is established for the data transmission with a pull mold should be maintained to said client, Said connection currently maintained by the client which received said maintenance information after the data transmission with said pull mold was completed is minded. It is characterized by recording the program which performs the junction function which transmits and receives the transmit data based on the push type from said server.

[0039]

[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained with reference to a drawing.

[0040] Drawing 1 is the block diagram showing the configuration of the data telecommunication system which has the data repeating installation concerning the gestalt of operation of this invention.

[0041] This data telecommunication system has a client (browser) 1, the server 2 to which secondary storage, such as a hard disk which stored the database 3, was connected, and the composition that ** was connected with the data repeating installation 60 to which the secondary storage 50, such as a hard disk, was connected in the network 70. In addition, in drawing 1 , the same sign is given to the component shown in drawing 8 , and the component which achieves the same function.

[0042] The program (let this be a relay program) for performing data communication processing (data communication facility) by the data offer method of the compound die which combined the data offer method of a push type and a pull mold is stored in secondary storage 50.

[0043] The data repeating installation 60 transmits and receives data between a client 1 and a server 2, and is equipped with the transceiver section 61, memory 62, and a central processing unit (henceforth CPU) 63.

[0044] The transceiver section 61 transmits and receives data between a client 1 and a server 2 through a network 70.

[0045] The storage region and work area which memorize the above-mentioned relay program loaded from secondary storage 50 are established in memory 62.

[0046] CPU63 performs data communication processing by the above-mentioned compound-die data offer method by

loading and performing the above-mentioned relay program in memory 62 from secondary storage 50 while controlling the whole equipment. About the detail of the data communication processing by this compound-die data offer method, it mentions later.

[0047] Drawing 2 is the functional block diagram having shown functionally the data telecommunication system which has the data repeating installation concerning the gestalt of operation of this invention. As shown in drawing 2 , this data telecommunication system has the composition of having added the junction processing section 100 between the browser 1 and the server 2, in the conventional structure of a system shown in drawing 8 . In addition, in drawing 2 , the same sign is given to the component shown in drawing 8 R> 8, and the component which achieves the same function.

[0048] Data repeating installation 60 is realized by performing the above-mentioned relay program read from secondary storage 50, and the junction processing section 100 consists of the demand junction device 110, a pull ID saved area 120, a push ID saved area 130, and a data junction device 140.

[0049] If a demand (data Request to Send) is received from a browser 1, the demand junction device 110 will pass the demand to a server 2, after it performs predetermined processing. In addition, the push header which is fixed length data is held beforehand at the demand junction device 110.

[0050] Moreover, the demand junction device 110 holds the initiation demand temporarily until it receives a push type data offer service termination demand, when a push type data offer service initiation demand is received.

[0051] After data offer of a push type is interrupted when there is a data Request to Send of the pull mold from a browser 1 while, as for this, the server 2 carried out data offer by the push type, data offer of a pull mold is carried out. This is because the demand junction device 110 is required to transmit a push type data offer service initiation demand to a server 2 when it makes a server 2 resume data offer of a push type after that.

[0052] Here, when the demand junction device 110 receives the demand from a browser 1, connection 150A by TCP mentioned above between a browser 1 and the junction processing section 100 is established and a server 2 receives the demand from the demand junction device 110, connection 150B by TCP mentioned above between the junction processing section 100 and a server 2 is established. And the data offered from a server 2 are inputted into a browser 1 through connection 150B, the junction processing section 100, and connection 150A.

[0053] Moreover, when a browser 1 cuts connection 150A, the junction processing section 100 cuts connection 150B. Furthermore, the junction processing section 100 may cut both the connections 150A and 150B. About this, it mentions later.

[0054] Therefore, in explanation after this, when [both] it means having established Connections 150A and 150B in [both] saying, "A connection is established" and says, "A connection cuts", it means that Connections 150A and 150B are cut.

[0055] The pull ID saved area 120 is a storage region for saving the identification information (henceforth ID) of the connection established by transmission of a demand of data offer with a pull mold. The connection shown by ID saved to this field does not restrict always connecting, but also when already cut, he is possible.

[0056] As an example of the above-mentioned connection's ID, when the socket is being used as API (Application Program Interface), a socket number is used.

[0057] The push ID saved area 130 is a storage region for holding a connection's (namely, connection 150A) ID currently maintained between current and a browser 1. When there is no connection, the push ID field 130 "is emptied." On the other hand, when ID is saved in the push ID saved area 130, a system guarantees that the connection is established.

[0058] The data junction device 140 will transmit data or a push header to a browser 1 using current and the connection currently maintained between browsers 1, if the push header from the data or the demand junction device 110 from a server 2 is received.

[0059] Next, the data communication processing by the compound-die data offer method of the data telecommunication system of a configuration of starting is explained with reference to the flow chart shown in drawing 3 R> 3.

[0060] If the junction processing section 100 receives the demand transmitted from the browser 1 (step S201), a connection (namely, connections 150A and 150B) will be established between a browser 1 and a server 2 (step S202).

[0061] The demand which received judges whether it is a push type data offer service termination demand (step S203),

and the junction processing section 100 judges whether the connection established for data offer of a push type was cut while transmitting the demand which received to a server 2 (step S204), when it is not the demand (step S205).
[0062] In step S205, when the connection is not cut, in a server 2, the demand reception device 21 transmits the received demand to the data transmitter style 22 (step S206). The data transmitter style 22 requests retrieval of the data of the request according to a demand from the data acquisition device 23. By searching a database 3, the data acquisition device 23 reads the desired data according to a demand, and outputs this read data (retrieval result) to the data transmitter style 22.
[0063] The data transmitter style 22 transmits the data of this request to a browser 1 through the connection (in this case, connection established for data offer of a push type) established in the above-mentioned step S202 while acquiring the data of the above-mentioned request from the data acquisition device 23 (step S207) (step S208).
[0064] A browser 1 will cut a connection with a server 2, if the data from the data transmitter style 22 of a server 2 are received (step S209).
[0065] In step S205, when the connection is cut, the junction processing section 100 transmits a push header to a browser 1 while recording a connection's ID established newly (step S210) (step S211).
[0066] In this case, the connection established for data offer of a push type to the midst of data offer by the push type is cut, and it means that the connection for data offer of a pull mold was established in step S202.
[0067] In order to enable it to perform data transmission of subsequent push types by the processing so far using the connection established at step S202, it means that a connection's ID established newly was recorded. Moreover, a push header is sent to a browser 1 through the connection from the junction processing section 100 so that the connection (namely, connection established at step S210) of a pull mold may not be cut.
[0068] When the above-mentioned step S211 is completed, in a server 2, the push data optional feature 24 is suitable timing, chooses which data are transmitted to a browser 1, and transmits it to the data transmitter style 22 (step S212).
[0069] The data transmitter style 22 requests from the data acquisition device 23 retrieval of the data of the request by which selection was made [above-mentioned]. By searching a database 3, the data acquisition device 23 reads the data (desired data) chosen by the push data optional feature 24, and outputs them to the data transmitter style 22.
[0070] The data transmitter style 22 acquires desired data (retrieval result) from the data acquisition device 23 (step S213), and transmits the data of this request to a browser 1 through the connection (in this case, connection established for data offer of a pull mold) established at the above-mentioned step S210 (step S214).
[0071] In step S214, since data are transmitted to the junction processing section 100 from a server 2, the junction processing section 100 transmits the received data to a browser 1 (step S215). When this step S215 is completed, processing after return and this step is performed to step S212.
[0072] In addition, in the above-mentioned step S203, the junction processing section 100 cuts current and the established connection (namely, connections 150A and 150B), when a push type service termination demand is received (step 216).
[0073] In this case, the connection established for data offer of a push type will be cut at the case of data offer of only a push type. On the other hand, when data offer by the interrupted push type is again performed after data offer by the push type was interrupted and data offer with a pull mold was performed, the connection established at the time of data offer of a pull mold will be cut.
[0074] Next, processing actuation of the demand junction device 110 in the junction processing section 100 is explained with reference to the flow chart shown in drawing 4 .
[0075] Since a connection (namely, connection 150A) establishes the demand junction device 110 newly between the junction processing section 100 and a browser 1 when the demand from a browser 1 is received, a connection's ID used for the demand transmission is recognized (step S301).
[0076] In addition, since a connection is established when there is a demand of either a push type data offer service initiation demand or a data Request to Send with a pull mold, a connection's ID used for the former transmission is set to "a1", and a connection's ID used for the latter transmission is set to "b1."
[0077] In the demand junction device 110, the demand which received judges whether it is a push type data offer service termination demand (step S302), and when it is not this service termination demand, the demand which received judges [whether it is a push type data offer service initiation demand and] (step S303).
[0078] In step S303, while writing ID (this example ID=a1) of the connection who has recognized the demand

junction device 110 in a push type data offer service initiation demand in the push ID saved area 130 (step S304), that service initiation demand is held temporarily.
[0079] Moreover, the demand junction device 110 transmits the demand (push type data offer service initiation demand) which received to a server 2 (step S306), and ends processing while it transmits the push header currently held beforehand to the data junction device 140 (step S305).
[0080] Since connection 150B of ID=a1 is established between the junction processing section 100 and a server 2 when this step S306 is completed, a server 2 can perform data offer to a browser 1. And the data of data offer by the push type transmitted from a server 2 are inputted into a browser 1 through connection 150B of ID=a1, the data junction device 140 in the junction processing section 100, and connection 150A of ID=a1.
[0081] When the received demand is not a push type data offer service initiation demand in the above-mentioned step S303 Since it will be called a data Request to Send with a pull mold, the demand junction device 110 While writing ID (this example ID=b1) recognized at step S301 in the pull ID saved area 120 (step S307), with reference to the push ID saved area 130, it judges whether the connection was maintained or not (step S308).
[0082] The connection will be maintained when ID is recorded on this push ID saved area 130. In this case, it means that a data Request to Send with a pull mold is in the midst of the data transmission by the push type, the connection (this example connection of ID=a1) of ID recorded by the push ID saved area 130 is already cut, and a new connection (this example connection of ID=b1) is stretched.
[0083] On the other hand, although the connection will be maintained and a data Request to Send with a pull mold is performed when nothing is recorded on the push ID saved area 130 (in the case of "empty"), it means that data transmission by the push type is not performed now.
[0084] In step S308, when the connection is not maintained, it progresses to the above-mentioned step S306. In this case, the data Request to Send by the push type is transmitted to a server 2.
[0085] In step S308, when the connection is maintained, while the demand junction device 110 writes the same ID (this example ID=b1) as ID written in at step S307 in the push ID saved area 130 (step S309), the push header currently held beforehand is transmitted to the data junction device 140 (step S310). In this example, the contents of preservation of the push ID saved area 130 are updated by ID=b1 from ID=a1.
[0086] The push header transmitted in step S310 is inputted into a browser 1 through the data junction device 140 and connection 150A of ID=b1. Consequently, even if it is the case where data offer with a pull mold is completed, the connection (namely, connections 150A and 150B of ID=b1) of ID=b1 is not cut by the browser 1.
[0087] And the demand junction device 110 which ended step S310 transmits processing of step S306, i.e., the push type data offer service initiation demand currently held, to a server 2.
[0088] Consequently, from a server 2, the data transmission by the interrupted push type will be resumed, and this data is inputted into a browser 1 through connection 150B of ID=b1, the data junction device 140 of the junction processing section 100, and connection 150A of ID=b1.
[0089] In step S302, a demand ends processing, after "emptying" the push ID saved area 130 (step S312), while cutting the connection of ID (this example ID=b1) by which the demand junction device 110 is recorded on that saved area with reference to the push ID saved area 130 in a push type data offer service termination demand (step S311). In step S311, the connections 150A and 150B of ID=b1 are cut.
[0090] Next, processing actuation of the demand junction device 110 in data offer of each data offer method is explained.
[0091] Type 1: [the case of only a push type]
steps S301-S306 -- it is again processed in order of steps S301 and S302 and steps S311 and S312.
[0092] Type 2: [the case of only a pull mold]
Step S301- It is processed in order of S303, S307, S308, and S306.
[0093] Type 3: [the case of the order of a push type, a pull mold, and a push type]
Case 1 (push type)
The order of steps S301-S306, a case 2 (pull mold)
They are steps S301-S303, S307-S310 and the order of step S306, and a case 3 (push type) again.
again -- steps S301-S306 -- it is again processed in order of the cases 1-3 of order ** of steps S301, S302, S311, and S312.

[0094] In addition, the demand at the time of four processings of step S301 is as follows. The 1st time is a push type data offer service initiation demand. The 2nd time is a data Request to Send with a pull mold. The 3rd time is a push type data offer service initiation demand currently held. The 4th time is a push type data offer service termination demand.
[0095] Here, an example of the contents of record of the pull ID saved area 120 at the time of data offer of three types mentioned above and the push ID saved area 130 is shown in drawing 5 .
[0096] Here, a connection's ID established in the case of a push type data offer service initiation demand is set to "a1", and a connection's ID established in the case of a data Request to Send with a pull mold is set to "b1."
[0097] In drawing 5 , ID shown with a sign 410 is written in in step S305, and is referred to in step S308. ID shown with a sign 420 is updated in step S309. ID shown with a sign 430 is updated in step S312 (in this case, it becomes the same as that of ID shown with a sign 420). Moreover, the ID is referred to in step S311, and is updated in step S312.
[0098] Next, processing actuation of the data junction device 140 is explained with reference to the flow chart shown in drawing 6 .
[0099] The data junction device 140 judges whether when the push header from the data or the demand junction device 110 from a server 1 was received (step S501), with reference to the pull ID saved area 120, the data transmission to a browser 1 was tried through the connection with ID of the reference result, and the data transmission was successful (step S502).
[0100] Processing is ended when it succeeds in data transmission in step S502. On the other hand, since the connection shown by ID obtained with reference to the pull ID saved area 120 is considered to already be cut when it fails, the connection shown by ID currently recorded on the push ID saved area 130 is used for the data junction device 140, the data transmission to a browser 1 is tried, and it judges whether the data transmission was successful (step S503).
[0101] In step S503, when it succeeds in data transmission, processing is ended, when it fails, exception processing of displaying the message which tells abnormalities is performed (step S504), and processing is ended.
[0102] Then, a compound-die data offer method explains with reference to the sequence diagram the connection at the time of offering data changing, and showing the example of processing of the junction processing section 100 of order in drawing 7 .
[0103] In this example, since it corresponds in Type 3 mentioned above, a connection's ID serves as contents shown in drawing 5 .
[0104] [-- condition [before a change]: -- the case of the case 1 of the above-mentioned type 3 --] -- in this condition, since processing which was shown in the case of the case 1 of the above-mentioned type 3 is performed, the following processings are performed.
(1): A connection a1 is maintained.
(2): A connection's a1 ID is saved in the push ID saved area 130.
(3): A server 1 performs data offer of a push type.
[0105] Therefore, as shown in drawing 7 between a browser 1 and a server 2, the data transmitted from the server 2 are inputted into the data junction device 140 of the junction processing section 100, and it is transmitted to a browser 1 through a connection a1 by performing processing as shown in drawing 6 (S610-630).
[0106] That is, data offer of a push type is performed by the connection a1 in this condition.
[0107] [-- change processing-state: -- the case of the case 2 of the above-mentioned type 3 --] -- here, in the condition before the above-mentioned change, the junction processing section 100 receives the data Request to Send of the pull mold from a browser 1, and presupposes that the connection b1 was established. That is, in this condition, since processing in the case of the case 2 of the above-mentioned type 3 is performed, the following processings are performed.
(1) A connection's b1 ID is written by the demand junction device 110 in both the pull ID saved area 120 and the push ID saved area 130.
(2) A push header is transmitted to the data junction device 140 from the demand junction device 110.
(3) A data Request to Send with a pull mold is transmitted to a server 2 from the demand junction device 110.
[0108] Therefore, as shown in drawing 7 between a browser 1 and a server 2, the data Request to Send with the pull mold transmitted from the browser 1 is inputted into the demand junction device 110 of the junction processing section 100, and is transmitted to a server 2 through a connection b1 by performing processing as shown in drawing 6 (S640).

[0109] Moreover, the data junction device 140 in which the data to a data Request to Send with the push header from the demand junction device 110 and the pull mold from a server 2 were received is transmitted to a browser 1 using a connection b1 in the sequence which received these data (S650). Here, data offer of a pull mold is completed.
[0110] That is, in this condition, data offer of a pull mold is performed and a connection b1 is established instead of a connection a1.
[0111] [-- condition [after a change]: -- the case of the case 3 of the above-mentioned type 3 --] -- in this condition, since processing in the case of the case 3 of the above-mentioned type 3 is performed, the following processings are performed.
(1) A connection b1 is maintained.
(2) A connection's b1 ID is saved in the push ID saved area 130.
(3) A push type data offer service initiation demand is transmitted to a server 2 from the demand junction device 110.
[0112] Therefore, the server 2 which received the push type data offer service initiation demand transmits data again by performing processing of steps S212-S214 shown in drawing 3 . The data junction device 140 of the junction processing section 100 which received the transmit data transmits data to a browser 1 through a connection b1 (660 S 670).
[0113] That is, in this condition, it comes to perform data offer of a push type using a connection b1.
[0114] As mentioned above, according to the gestalt of this operation, data offer by the compound-die data offer method can be carried out by having formed the junction processing section 100 (namely, data repeating installation 60) between the browser 1 and the server 2.
[0115] That is, even if it is the case where the connection at the time of data offer by the push type data offer method is cut, data offer by the interrupted push type data offer method is continuable [data offer by the pull mold data offer method is performed to the midst of data offer by the push type data offer method, and] again using the connection at the time of data offer by the pull mold data offer method.
[0116] Moreover, although the gestalt of this operation explained the data communication between one browser and one server, you may make it be a degree as an application of the gestalt of this operation. That is, you may make it prepare the pull ID saved area and push ID saved area corresponding to two or more browsers in the junction processing section 100, respectively.
[0117] In this case, when a data Request to Send with the pull mold from two or more clients of each concerned is during the data transmission from the server which answered the push type data offer service initiation demand transmitted from two or more browsers of each, a demand junction device stores a connection's identification information established at the time of data offer by the pull mold data offer method in the pull ID saved area and the push ID saved area corresponding to the browser which transmitted this data Request to Send.
[0118] And a data junction device transmits the transmit data based on the push type data offer method from a server to the corresponding browser through the connection shown by the identification information obtained as a result of this reference with reference to the contents of storage of the push ID saved area corresponding to the browser which transmitted the push type data offer service initiation demand.
[0119] In addition, since identification information, such as an address number of a publishing agency, and the actual contents of a demand are transmitted in case a demand is published, the server which received the push type data offer service initiation demand can know the transmitting partner (address number of a browser) of data easily.
[0120] Therefore, a data junction device can be transmitted to the browser of the transmitting partner to whom the data received from the server are transmitted with this data. Therefore, according to this application, data offer by the push type data offer method interrupted for implementation of data offer by the pull mold data offer method can be resumed also to two or more browsers.
[0121] Furthermore, in the gestalt of this operation, the program for performing each procedure of the above-mentioned processing may be stored in the record medium which CD-ROM etc. can computer read, and may be distributed.

[Translation done.]

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the block diagram showing the configuration of the data telecommunication system which has the data repeating installation concerning the gestalt of operation of this invention.
[Drawing 2] It is the functional block diagram having shown functionally the data telecommunication system which has the data repeating installation concerning the gestalt of operation of this invention.
[Drawing 3] It is the flow chart which shows data communication processing actuation of the data telecommunication system shown in drawing 2 .
[Drawing 4] It is the flow chart which shows processing actuation of the demand junction device in the data repeating installation shown in drawing 2 .
[Drawing 5] It is drawing for explaining an example of the contents of record of a pull ID saved area and a push ID saved area.
[Drawing 6] It is the flow chart which shows processing actuation of the data junction device in the data repeating installation shown in drawing 2 .
[Drawing 7] It is a sequence diagram for explaining the data transmission and reception between a browser and a server.
[Drawing 8] It is the block diagram showing the conventional data offer structure of a system.
[Drawing 9] In the data offer system shown in drawing 8 , it is drawing for explaining the situation of data offer by the pull mold data offer method.
[Drawing 10] It is a sequence diagram for explaining the data transmission and reception between the browser by the conventional pull mold data offer method, and a server.
[Drawing 11] In the data offer system shown in drawing 8 , it is drawing for explaining the situation of data offer by the push type data offer method.
[Drawing 12] It is a sequence diagram for explaining the data transmission and reception between the browser by the conventional push type data offer method, and a server.
[Drawing 13] In the data offer system shown in drawing 8 , it is a sequence diagram for explaining the processing actuation at the time of carrying out data offer combining a pull mold data offer method and a push type data offer method.
[Description of Notations]
1 Client (Browser)
2 Server
3 Database
50 Secondary Storage
60 Data Repeating Installation
61 Transceiver Section
62 Memory
63 Central Processing Unit (CPU)
70 Network
100 Junction Processing Section

110 Demand Junction Device
120 Pull ID Saved Area
130 Push ID Saved Area
140 Data Junction Device
150A, 150B Connection

[Translation done.]